NETWORK WORLD
The Newsweekly of User Networking Strategies

Volume 6, Number 47 | An IDG Communications Publication | November 27, 1989

DCA sells off WAN unit to Racal-Milgo

By Jim Brown
Senior Editor

ALPHARETTA, Ga. — Digital Communications Associates, Inc. last week sold its unprofitable Network Communications Group, which markets T-1 multiplexers and other wide-area network (WAN) products, to Racal-Milgo for $30 million.

Under the agreement, Racal-Milgo will acquire DCA's System 9000 T-1 multiplexers, Series 300 statistical multiplexers and Open Network Management System. Racal-Milgo, which sells an array of modems, point-to-point multiplexers and network management systems, agreed to pay DCA up to $20 million more for the group, depending on how successful it is in selling the DCA products over a three-year period beginning April 1, 1990.

The sale marks the end of DCA's effort to become a one-stop data communications vendor. The company faced difficulties merging its WAN unit with its Personal Computer Communications Group, which sells microcomputer-to-mainframe and local-area network products. As a result, DCA had trouble meeting development plans for LAN-to-WAN interconnection products.

Analysts said DCA was hampered by slow sales of the WAN products and depressed earnings

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> "Managers need to balance the need to keep an eye on today's costs while at the same time building platforms that will support tomorrow's communications needs."
>
> **Jerald Marcone**
> President
> Communications
> Managers Association

CMA chief surveys changing role of telecom managers

Jerald Marcone discusses new technologies, outsourcing and competition in long distance.

As president of the Communications Managers Association (CMA), Jerald Marcone has worked to dispel the notion that CMA is a regional group.

The 20-year telecommunications veteran says that while CMA member companies are based in New York, most have offices throughout the world. "New York may be our home," he says, "but our reach extends well beyond the city."

This week, more than 4,000 network professionals are expected to attend CMA's 12th annual conference, which will be held Nov. 28-30 at the New York Hilton Hotel. The three-day conference, "Telecommunications: Changing the Way We Live and Work in the '90s," is the highpoint of CMA's yearlong slate of educational and peer networking activities.

Marcone recently took time out from conference planning and his duties as assistant vice-president of telecommunications at Crum & Forster Corp. in Morristown, N.J., to talk with Network World *Staff Writer Wayne Eckerson.*

What is the biggest challenge facing communications managers today?

One of our biggest challenges is learning to become a juggler and a politician. Managers need to balance the need to keep an eye on today's costs while at the same time building platforms that will support tomorrow's

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TI embraces X.400 as medium for EDI

Texas Instruments to use messaging standard to exchange EDI documents with trading partners.

By Wayne Eckerson
Staff Writer

DALLAS — EDI pioneer Texas Instruments, Inc. has disclosed plans to use the Open Systems Interconnection X.400 message transfer protocol to exchange EDI documents with its trading partners around the world.

TI is one of the first major users to endorse X.400 as a means to support electronic data interchange. The move represents the first step in the company's long-term strategy to standardize on X.400 for all external communications.

"Eventually, we want to use X.400 as our primary gateway to outside companies for all information, whether it's EDI, electronic mail, outgoing text-only fax or telex," said Jeff Sturrock, TI's EDI manager.

"The beauty of X.400 is that it lets people on dissimilar machines in different companies exchange information," he said. "When it becomes widely implemented in five to 10 years, X.400 will be the data equivalent of the phone system."

Many companies currently use X.400 for E-mail, but few use the standard as an envelope for EDI documents, said Alvan Bixler, director of technical operations at TDCC: Electronic Data Interchange Association in Alexandria, Va.

"This is a step in the right direction," he said. "It brings users together under a standard com-

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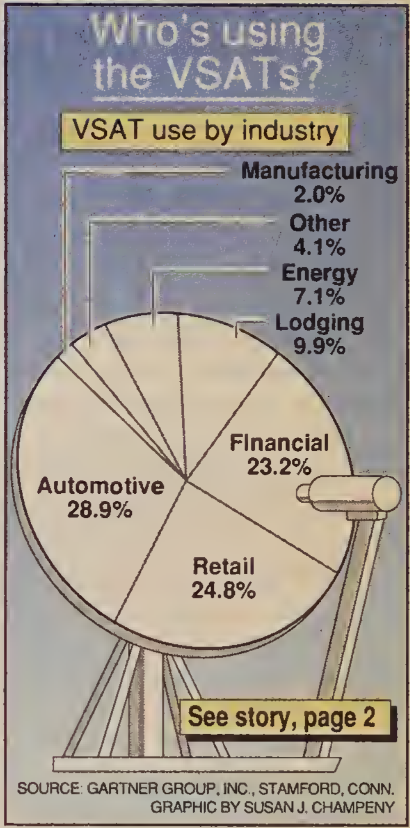

SOURCE: GARTNER GROUP, INC., STAMFORD, CONN.
GRAPHIC BY SUSAN J. CHAMPENY

NETLINE

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DATA GENERAL INTROS an E-mail gateway based on X.400 and X.500 standards. Page 2.

AT&T INKS $30M Tariff 12 deal with Aetna for custom voice and data network. Page 2.

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U.S. TRADE GROUP allows duties on foreign telecommunications equipment. Page 4.

PRESIDENT BUSH nominates a relative unknown to fill a vacant FCC seat. Page 6.

COMPARE VSAT SERVICES with this week's Buyer's Guide. Page 35.

NEWSPAPER

FEATURE

The best way to prevent a disaster: Plan for one

By Daniel Briere
and L. Thomas Walton
Special to Network World

Disaster can strike your network at any time. Even the best telephone systems sometimes fail, even though the Bell operating companies have sophisticated disaster teams and procedures to deal with failures ("Apocalypse now?" *NW*, Sept. 4 and Sept. 11).

However, large-scale disasters, such as the outages caused by Hurricane Hugo and the recent California earthquake, aren't the only events that can shut down your telephone system. More often, local outages caused by fires, explosions, cable cuts or even on-premises equipment failures are responsible for knocking out communications.

Fortunately, telephone companies have become much more responsive to inquiries regarding alternate routing to business locations and dual central

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OS/2 data base servers to blossom

By Susan Breidenbach
West Coast Bureau Chief

The trickle of downsizing that began in this decade should become a torrent in the 1990s as the emerging class of OS/2-based data base servers prove themselves trustworthy platforms for mission-critical applications.

ANALYSIS

Three old hands — IBM, Oracle Corp. and Ingres Corp. — and two relative newcomers — Sybase, Inc. and Gupta Technologies, Inc. — will navigate the rapids of this new market, each guided by its own vision of what a microcomputer data base server should be.

But they all agree on one

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DG unveils E-mail gateway that supports X.400, X.500

Software translates messages from wide array of networks for DG's Eclipse/MV minicomputers.

By Tom Smith
New Products Editor

WESTBOROUGH, Mass. — Data General Corp. last week introduced software that enables users of its Eclipse/MV minicomputer to exchange messages with users in a variety of network environments.

The software, dubbed Communications Server, is based on the X.400 message-handling and X.500 directory standards. Customers can use the software to communicate with X.400-compatible computers and networks, systems supporting IBM's Systems Network Architecture Distribution Services (SNADS) and computers running DG's own Comprehensive Electronic Office software.

It also enables users on Eclipse-attached terminals and personal computers to send and receive facsimiles and telexes.

Communications Server is the second major product introduced under DG's Distributed Applications Architecture (DAA), a blueprint for supporting distributed

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Study says higher range VSAT demand on the rise

Vendors must support T-1 rates to realize growth.

By Tom Smith
New Products Editor

STAMFORD, Conn. — The VSAT market will grow dramatically between 1989 and 1994 if vendors are able to meet users' increased performance needs, according to Gartner Group, Inc., a research firm here.

The dollar value of shipments of very small aperture terminal satellite equipment is expected to grow from $215 million in 1988 to $1.09 billion by 1994, according to Gartner Group figures. The firm also predicts an increase in units shipped from 13,800 in 1988 to 70,000 in 1994. Those figures represent a compound annual growth rate of 31.6%.

That growth, however, hinges on the ability of major vendors to provide higher bandwidth VSATs and more net management functionality than currently available, said Howard Hecht, a senior research analyst at Gartner Group.

Gartner Group's research indicates that the automotive industry is the predominant user of VSATs, followed closely by the retail and financial sectors.

The firm's research also shows that customer demand for VSATs is outstripping vendor manufacturing capacity, meaning some users have to wait as long as 18 months between the placement of an order and the date when the network is actually cut over.

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AT&T signs insurance co. to a $30m Tariff 12 deal

By Gail Runnoe
Washington Correspondent

HARTFORD, Conn. — Aetna Life & Casualty last week became AT&T's latest Tariff 12 customer when it awarded the carrier a three-year contract valued at $30 million for a customized voice and data network.

The network will support all of Aetna's data traffic and half of its voice traffic, said John Donovan, Aetna's vice-president of telecommunications. MCI Communications Corp. provides the other half of Aetna's voice service under a contract awarded last spring ("Aetna signs with MCI for all outbound voice service," *NW,* May 15).

The Aetna Tariff 12 network will connect Aetna's headquarters here to 318 domestic field offices and about a dozen international sites in Europe and the Pacific Rim. About 45,000 users will be supported in all, Donovan said.

While he declined to disclose how much money Aetna will save under its new Tariff 12 offering, Donovan said Aetna's savings would be significant. The network service will begin in the first quarter of 1990.

Prior to signing the Tariff 12 agreement, Aetna used AT&T for all of its data services, domestic and international inbound voice service, and international outbound voice service under "off-the-shelf tariffs," said Donovan. Aetna's decision to revise this arrangement "was a positioning move on our part to enable us to

(continued on page 8)

Briefs

A very fast network. Washington University in St. Louis last week signed research agreements with Southwestern Bell Telephone Co., NEC America, Inc. and SBC Technology Resources, Inc. as part of a three-year $5 million project to build an advanced fast packet network.

The network, designed by a Washington University professor, will consist of four broadband packet-switching nodes linked by fiber optics. The nodes will connect two university offices, a Southwestern Bell central office and an SBC Technology office across a 20-mile stretch in downtown St. Louis. A demonstration of the net is scheduled to take place in 1991.

Each 16-port switch will have an aggregate switching capacity of 1.6G bit/sec. The network architecture can handle over one gigabit per port and more than one terabit of aggregate capacity. The university said the network's transmission rates will be more than 1,000 times faster than current high-speed networks.

The fast packet network will initially support four applications: workstation-based imaging, multilocation distribution of entertainment video, full-motion videoconferencing and interactive video services.

Datapoint takes charge. Datapoint Corp. last week announced a reorganization of its sales and marketing organizations that will lead to a $2.2 million charge against fiscal first-quarter earnings for the period that ended Oct. 31.

The onetime extraordinary charge will cover costs incurred as a result of the work force reduction. The company, which recently rolled out a 20M bit/sec version of its Arcnet local-area network, will eliminate 50 of the 90 positions in its sales and marketing organization. Raymond Dittrich, vice-president of U.S. sales, resigned.

ISDN down under. General DataComm, Inc. last week said it has signed a contract to install what it claims is the first T-1 multiplexer network to use Integrated Services Digital Network services. General DataComm will begin a pilot test in March for an unidentified Australian conglomerate, which will use ISDN Primary Rate Interface lines supplied by Telecom Australia for disaster recovery.

The 12-node pilot network will be based on General DataComm's Megamux Transport Management System T-1 multiplexers and will support compressed voice and data. Using ISDN services will cost about half as much as using dedicated private lines because the Primary Rate Interface lines will be configured as a virtual private network and the user will pay for the service on a usage-sensitive basis.

Strike out. Nynex Corp. and negotiators for the Communications Workers of America last week reached a tentative accord on a three-year labor contract. The agreement must be ratified by rank-and-file members, but it clears the way for striking workers to return to work next week. Members of the International Brotherhood of Electrical Workers ratified a three-year pact 10 days ago and returned to work last week.

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Data Communications
AT&T's ASDS will likely be the beginning of the end for the carrier's Dataphone Digital Service, analysts said. **Page 17**

Local Networking
While Microsoft Corp. and IBM were stealing the net operating system headlines at Comdex/Fall '89, Novell, Inc. was quietly ushering in the era of server-based NetWare applications. **Page 19**

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Framingham, Mass. 01701-9172
(508) 820-2543

Second-class postage paid at Framingham, MA, and additional mailing offices. *Network World* (USPS 735-730) is published weekly, except for a single combined issue for the last week in December and the first week in January by Network World Publishing/Inc., 375 Cochituate Road, Box 9172, Framingham, MA 01701-9172.

To apply for a free subscription, complete and sign the qualification card in this issue or write *Network World* at the address below. No subscriptions accepted without complete identification of subscriber's name, job function, company or organization. Based on information supplied, the publisher reserves the right to reject non-qualified requests. Subscriptions: 1-508-620-7760.

Non-qualified subscribers: $3.00 a copy; U.S. — $95 a year; Canada, Central & South America — $110 a year; Europe — $165 a year, all other countries — $245 a year (airmail service). Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin. Please include mailing label appearing on front cover of the publication.

Network World can be purchased on 35mm microfilm through University Microfilm Int., Periodical Entry Dept., 300 Zebb Road, Ann Arbor, Mich. 48106.

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POSTMASTER: Send Change of Address to *Network World,* Box 9172, Framingham, Ma. 01701-9172.

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█  DATE          DESTINATION            ORDER              GREETING

May 14, 1989   Mrs. Betty Benson      1 Dozen Garden     Happy Mother's
               779 Mills Ave          Roses              Day!
               Chicago, IL  60601                        Love, Hank

May 14, 1989   Mrs. Bette Marvin      Mixed Bouquet      Warmest Wishes
               45 Bank St                                on Mother's
               Brisbane, CA  94005                       Day.  Marc

May 14, 1989   Mrs. Marlon Elder      1 Dozen Pink       To the
               1597 Corona Blvd       Roses              Greatest Mom
               Boston, MA  02134                         Ever.  Maddy

May 14, 1989   Mrs. Cheri Baird       Iris Bouquet       Hugs and
               321 Park Lane                             Kisses.
               NY., NY.  10013                           Love, Sheila

May 14, 1989   Mrs R. Schumacher      Potted Mums        Thinking of
               14 Briana Way                             You, Mom.
               Denver, CO  80205                         Love, Lauren
                                                               ORDERS.DOC
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ISDN customers press AT&T for new users group

By Bob Wallace
Senior Editor

SCOTTSDALE, Ariz. — Having won major deployment and pricing concessions from AT&T, early Integrated Services Digital Network customers are now asking the company to establish an ISDN users group.

The need for a users group arose at a meeting here of AT&T's ISDN Primary Rate Interface customers. The three-day event, hosted by AT&T, was designed to promote wider usage of ISDN and collect user input for future service enhancements.

Many of the 21 ISDN users that attended the meeting, including CSX Corp. and MasterCard International, Inc., said the formation of a formal AT&T ISDN users group would enable customers to exchange valuable experiences.

"We absolutely have to have a users group that meets regularly to serve as a forum for the discussion of advantages and shortcomings of the service, and implementation experiences," said Preston Lawson, senior director of telecommunications engineering for CSX Technology, the Jacksonville, Fla.-based communications services subsidiary of CSX Corp.

One user at the meeting told attendees that his company has been able to successfully match 62% of the calls it received against customer phone numbers in its data base with the ISDN automatic number identification (ANI) feature, according to Al Wilmer, telecommunications director for MasterCard.

This is significant because some skeptics have argued that the usefulness of ANI would be severely limited because customers would often be calling from unidentifiable numbers, such as public phones or corporate telephone switches.

According to Wilmer, the speaker said ANI increased the productivity of his company's customer service agents by 17% to 20%.

"That's the kind of information we're looking for from this type of meeting. I attended the meeting to find out what the measurable benefits of ISDN are from the companies that have been using [Primary Rate Interface] the longest. An ISDN users group would help me do that; it's something I would support," Wilmer said.

Other ISDN Primary Rate Interface users, including Comdisco Disaster Recovery Services, Inc. and Union Pacific Railroad Co., have also expressed interest in meeting with users to share their experiences, according to John Kauza, ISDN and Signaling System 7 manager for AT&T.

AT&T, however, declined to say if it planned to establish a formal ISDN users group for the 36 companies that currently use the Primary Rate Interface.

But the carrier did say it is already planning to hold another ad hoc ISDN user meeting, possibly as soon as January. "They all requested another meeting, and [they] promised to review issues discussed in [Scottsdale] and [to] suggest potential agenda items for the second meeting," Kauza said.

At the recent meeting, AT&T detailed plans to broaden ISDN deployment, cut the price of ANI by one-third and offer the previously optional Call-by-Call Service Selection feature free with its Primary Rate Interface service ("AT&T to up PRI access, lower costs," *NW*, Nov. 20).

After the meeting, AT&T publicly revealed the identities of two Primary Rate Interface users — Union Pacific Railroad, which uses ANI to enhance its customer service operations, and MasterCard, which is testing ANI for possible use with a similar application.

Meeting attendees contacted by *Network World* said they came away from the meeting with ideas on how to expand usage of ISDN. "The meeting gave me a much broader view of ISDN applications. At several points during the presentations, I said to myself, 'I hadn't thought of that application. I bet it would work in my shop,' " CSX Technology's Lawson said.

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ITC OKs antidumping duties for East Asian firms' small key sets

Commission says U.S. vendors have been 'materially injured.'

By Bob Brown
Senior Editor

WASHINGTON, D.C. — The U.S. International Trade Commission (ITC) last week ruled that U.S. telephone equipment vendors have been "materially injured" by Japanese and Taiwanese products dumped on the U.S. market.

Acting on a complaint filed by AT&T in December 1988, the ITC gave the U.S. Customs Service the authority to levy antidumping duties on small private branch exchanges, key telephone sets and switch subassemblies exported to the U.S. by East Asian vendors ("AT&T declares war on foreign vendors," *NW*, Dec. 26, 1988/Jan. 2, 1989).

The ruling makes permanent temporary duties the Commerce Department last month imposed on Japanese and Taiwanese manufacturers, including Toshiba Corp.

AT&T charged that foreign firms were selling products in the U.S. below cost in an effort to win market share. AT&T and other U.S. vendors said the pricing battle hurt their sales and forced them to cut their work forces and manufacturing output.

The duties, which are designed to make up the difference between the price at which a vendor sells its products at home and the lower price at which it "dumps" its wares in the U.S., will require foreign vendors to pay the U.S. government up to 180% of the declared value of their product at home.

When foreign vendors try to cover the duty by raising their prices here, U.S. vendors are likely to respond with higher prices of their own, some observers said.

But according to Karen Sabbak, a research associate at The Eastern Management Group, a Parsippany, N.J.-based market research firm, the price of telephone equipment should not increase more than 10%.

Price hikes will be minimal because foreign vendors will try to avoid the duties by stepping up manufacturing in the U.S. and other countries that are exempt from the duties, Sabbak said. Also, telephone equipment dealers in the U.S. have stocked up on foreign equipment in anticipation of the ruling and, as a result, will be able to keep their prices low, she said.

AT&T, which was joined by Comdial Corp. of Charlottesville, Va., in filing the petition, was pleased with the ITC ruling. "We are confident that all U.S. manufacturers can be very successful in this market once unlawful pricing ends," AT&T said.

In filing its petition, AT&T said foreign manufacturers had increased their share of the U.S. market for small telephone systems to 60% from 40% three years before. The U.S. market for small telephone systems, which sell for between $2,000 and $50,000, is worth about $4 billion.

The ITC ruling applies to a specific set of vendors from Japan and Taiwan that import systems supporting two to 256 ports. South Korean vendors Samsung Group and Goldstar Co., which were cited in the complaint, were given a 60-day extension by the Commerce Department to state their case.

Edwin Spievack, president of the North American Telecommunications Association, a national trade group for network equipment vendors and users, said AT&T's decision to file its complaint could be viewed as a warning to foreign manufacturers of larger network equipment.

"The price competition is much more severe in the big system equipment market," Spievack said.

NIST to unveil plan to accredit labs for GOSIP-conformance tests

By Gail Runnoe
Washington Correspondent

GAITHERSBURG, Md. — The National Institute of Standards and Technology (NIST) will hatch a plan today for accrediting laboratories nationwide to test products for compliance with the Government Open Systems Interconnection Profile (GOSIP).

The accreditation of GOSIP testing laboratories will assure potential buyers that products comply with the federal government's specification and that accredited offerings are interoperable.

NIST will gather users, vendors and potential testing laboratory operators at its headquarters here, where it is sponsoring a one-day workshop detailing the plan, called Proposed Information Processing Standard for GOSIP Conformance and Interoperation Testing and Registration.

According to Stephen Nightingale, a computer scientist at NIST, the plan calls for three types of testing: OSI conformance testing; interoperability testing against a NIST-provided GOSIP protocol implementation; and multivendor interoperability testing over OSInet, a multivendor wide-area network run by NIST to demonstrate OSI capabilities. The OSInet tests will display product performance in a working environment.

As of Aug. 15, 1990, federal government agencies will be required to specify GOSIP compliance in procurements for virtually all network product acquisitions.

NIST will maintain public registers of accredited testing labs and test methods, and it will list products that have passed OSI conformance and interoperability testing.

Nightingale said NIST itself will not perform GOSIP conformance or interoperability testing but will farm out the work to laboratories to be accredited by the National Voluntary Laboratory Accreditation Program, also based here.

While the accreditation process is still being set up, Nightingale said it is likely the Corporation for Open Systems International, which already operates OSI conformance and interoperability testing labs, will be the first lab accredited to perform GOSIP conformance testing.

He could not, however, estimate when

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See the FAXNeT Form on Page #59

Group to address Station Management part of FDDI

By Laura DiDio
Senior Editor

NORTH BILLERICA, Mass. — Synernetics, Inc., a software start-up, announced last week it is spearheading a 10-member vendor consortium to develop a consistent implementation of the Station Management (SMT) portion of the FDDI standard.

The consortium, called the SMT Development Forum, includes such industry heavyweights as IBM and Apple Computer, Inc. Synernetics is a year-old manufacturer of Fiber Distributed Data Interface Station Management software headquartered here.

By working on a common interoperable SMT implementation, the Forum members hope to speed both FDDI product introductions and end-user acceptance of the emerging standard, said Bruce McClure, Synernetics founder and president.

The consortium's charter members, and all subsequent firms that join, will use the common SMT implementation in their FDDI products in an effort to further interoperability.

Intelligent net control

The SMT portion of the FDDI standard provides the intelligent network management capabilities that enable systems administrators to manage and monitor FDDI networks and to isolate and

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Duggan proposed to fill last remaining FCC slot

Name unfamiliar among communications sect.

By Gail Runnoe
Washington Correspondent

WASHINGTON, D.C. — President Bush last week nominated Ervin Duggan, a virtual unknown among communications industry insiders, to the post of Federal Communications Commissioner, filling the last remaining vacancy at the regulatory agency.

Passing over some better known and arguably better qualified candidates, the nomination came as a surprise to many observers.

"No one seems to know much about him," said Brian Moir, Washington counsel for the International Communications Association. "He's not well-known in any aspect that has to do with the Communications Act [of 1934]."

Duggan has headed his own Washington consultancy — Ervin S. Duggan & Associates — since 1981. The firm reportedly helps corporate executives prepare for television appearances, congressional testimony and other public appearances. Prior to setting up his own shop, Duggan served as a member of the State Department's policy planning staff from 1979 to 1981 and as special assistant to the Secretary of the Department of Health, Education and Welfare. Duggan also served as special assistant to former Senator Adlai Stevenson (D-Ill.) from 1971 to 1977.

"It's fairly clear that it wasn't the White House's goal to appoint somebody that could hit the deck running," Moir said. "They're disregarding candidates [who] have extensive backgrounds in this area in favor of [someone] with no background."

Duggan's position on many of the controversial issues now facing the FCC — such as custom tariffs, price cap regulation for local exchange companies and changes to the Modified Final Judgment — is unclear. "We're all interested in finding out more about the individual," Moir said.

If confirmed, Duggan will succeed former Commissioner Patricia Diaz Dennis, who left the FCC in October, and will serve a five-year term ending July 1, 1994. The Duggan nomination will soon be passed to the Senate Commerce Committee, which will then vote on whether to forward it for approval by the full Senate.

Last summer, the president appointed two other FCC commissioners, Sherrie Marshall and Andrew Barrett, as well as a new commission chairman, Alfred Sikes. Sikes was formerly assistant secretary for communications and information in the Department of Commerce and administrator of the National Telecommunications and Information Administration.

DCA sells off WAN unit

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in its Personal Computer Communications Group. With the acquisition of DCA's WAN unit, Racal-Milgo will be positioned to supply everything from backbone T-1 products and channel banks to low-end modems for multidrop analog tail circuits.

The move also insulates Racal-Milgo from an expected downturn in modem sales caused by the increased use of digital facilities such as fractional T-1 and Integrated Services Digital Network offerings, analysts said.

"Racal-Milgo is in the same position as Codex and [AT&T] Paradyne," said Mary Modahl, an analyst with research firm Forrester Research, Inc. in Cambridge, Mass. "Firms in the modem segment are asking, 'How are we going to diversify our businesses [given] digital nets and ISDN are going to eliminate the need for our core business?' "

As part of the sale, which is expected to be completed in 30 to 60 days, Racal-Milgo agreed to retain all current DCA employees as well as DCA's existing facilities here and in San Jose, Calif.

Racal-Milgo plans to revamp its Omnimux 8000 T-1 multiplexers and Omnimux 7000 channel banks for compatibility with the System 9000, said Glen Smith, vice-president of marketing. Racal-Milgo will also merge DCA's network management system into its own Communications Management Series products.

DCA did not sell the assets of Digital Transmission Systems, Inc., a T-3 Digital Access and Cross-Connect System maker it bought in December 1988. A DCA spokesman said Digital Transmission Systems will continue to develop a T-3 multiplexer product for DCA. Racal-Milgo said it will develop its own T-3 products based on the System 9000.

The Network Communications Group dragged down DCA's profits for the fiscal year, ended June 30. The WAN unit lost over $7 million on revenues of $56 million for the fiscal year. Overall, DCA pushed a $17.7 million profit on revenues of $208 million.

Racal-Milgo has been reselling DCA's System 9000 as its Omnimux 9000 since December 1987 and was rumored to be trying to acquire all or part of DCA last summer, as was Motorola, Inc.

While selling the unit may bolster DCA's stock price in the short term, it also effectively prevents DCA from taking a leading position in the LAN-to-WAN integration market, analysts said. DCA seemed well positioned to develop products needed to link remote LANs as well as provide connections between LAN-attached microcomputers and remote mainframes, said Joaquin Gonzalez, an analyst with the Meta Group, a Westport, Conn.-based market research firm.

But "DCA couldn't pull it off," Gonzalez said. "DCA has gone from being a potential big player to cancelling itself out."

> "Digital networks and ISDN are going to eliminate our core business."
>
> ▲▲▲

OS/2 servers to blossom

continued from page 1

point: Price/performance considerations make the acceleration of downsizing — the migration of business applications from hosts to microcomputer local-area networks — inevitable.

Experts say mainframe computing power costs about $125,000 for every million instructions per second (MIPS), while microcomputers can deliver one MIPS for less than $1,000.

To date, that overwhelming economic advantage has been countered by concerns about the reliability and security of the microcomputer server environment. But the emergence of superservers and a new generation of network operating systems are allaying such fears.

"We're in the early adoption phase, in which key customers will prove OS/2 data base servers by putting mission-critical applications on them," said Richard Finkelstein, president of Chicago-based Performance Computing, Inc.

"Mainframes won't go away, but the backlog of [desired] applications can be implemented a lot faster and cheaper on OS/2 data base servers," he said.

The question is, which of those servers will users choose?

Looking purely at performance, Gupta Technologies' SQLBase seems to have an edge right now. A recent series of independent benchmark tests commissioned separately by Microsoft Corp., Oracle and Gupta Technologies produced some conflicting results that the three companies are hotly contesting. But the SQLBase scores were particularly impressive.

Pure performance is seldom enough. Gupta Technologies may have the fastest OS/2 data base engine, but it is the smallest firm with the least marketing clout and no mainframe- or minicomputer-based versions of SQLBase to offer an upgrade path.

This gives SQLBase an independence the other data base servers don't have. Instead of trying to support SQLBase on multiple platforms, Gupta Technologies instead has been busy building gateways to popular data base management systems, including IBM's mainframe-based DB2. It also has a DOS version that can be used to create applications that run on an OS/2 SQLBase server.

Analysts don't expect the server version of IBM's OS/2 Extended Edition Data Manager to set any speed records when it's released next March. But a good portion of the True Blue shops are expected to gravitate toward it for other reasons.

For one, IBM has promised to connect OS/2 Extended Edition Data Manager to its mainframe DB2 data base. Also, the Data Manager server will be supported by all of IBM's Systems Application Architecture languages.

However, the initial release lacks the forward recovery capability that is essential in a transaction-processing environment.

The Sybase product — marketed as the Microsoft/Ashton-Tate Corp. SQL Server — is proving to be a good transaction-processing platform, and a handful of pioneering corporate users are beginning to develop core business applications based on it.

The Sybase engine was originally developed for the Digital Equipment Corp. VAX environment, where it was competing with Oracle and Ingres and where compatibility with IBM was not much of an issue. Sybase differentiated its product by deviating from IBM-standard SQL methods.

Sybase also uses a procedural approach to maintaining data consistency, or "referential integrity," across tables. This differs from the nonprocedural method defined by IBM for DB2.

So, as Rod Zimmermann, Gupta Technologies product marketing manager, is fond of pointing out, what were performance-enhancing assets in the VAX world could be liabilities where IBM compatibility is paramount.

One important asset that Gupta Technologies lost earlier this year was codevelopment partner Lotus Development Corp., which defected first to Oracle and ultimately to Sybase. Lotus 1-2-3 is by far the single most widely used personal computer application in the world, and Lotus has said that program, Lotus 1-2-3G and Lotus DBMS will work best with SQL Server.

"That kind of commitment to a data base server is very important," Finkelstein said.

Ingres will probably be the last to market with an OS/2 data base server, but it could be a real sleeper because of the emergence of multiple processor servers. The product Ingres plans to release next year will support load balancing across multiple processors with multiple threads of execution within each processor.

The other four products use either a single-process, multithreaded architecture, assigning a thread to each user (SQL Server and SQLBase), or they take a multiple-process approach and start up a new process for each user. The former creates much less memory overhead in the server, while the latter seems better suited to multiple-processor servers.

Ingres will offer the best of both worlds, Finkelstein said. "That's the optimal data base server architecture."

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Insurance co. signs $30m Tariff 12 deal

continued from page 2

tap into new [capabilities] through digital technology," he said.

Citing competitive reasons, Donovan said he would not describe the new capabilities Aetna will receive under the Tariff 12 arrangement. However, typical applications the network will support include claims processing and data entry, he said.

Aetna conducted a competitive bid for the data and voice services not covered under the earlier MCI contract, Donovan said, adding that "prices were competitive among the respondents." But the decision to go with AT&T was not based on price, he said, but rather on the capabilities of AT&T's proposed network and "their willingness to meet our specific requirements."

Donovan said MCI also bid to offer the services, but he declined to name the other bidders.

Service cost

The network will include 1,721 ports and 502 data lines. Aetna will pay a flat $481,200 monthly fee as well as time- and distance-sensitive usage charges. Prices for switched voice service for domestic on-net calls during the day range from 6.2 cents per minute for a 200-mile call to 13.3 cents for a 5,000-mile call.

Volume discounts of 8% are applied to monthly domestic usage over $10,000; 10% for usage between $10,000 and $400,000; and 16% for usage over $400,000. ◘

Higher range VSAT demand on the rise

continued from page 2

"Some vendors are more concerned with sales than manufacturing," Hecht said. "They have not placed enough emphasis on getting [the] product out."

To realize the growth potential forecasted by Gartner Group, VSAT vendors will have to be able to support data transmission rates in the T-1 range and above, rather than the 56K bit/sec commonly used today, according to Hecht.

"They need to provide these capabilities to the market by about 1991, or they'll only have a very small niche market left," Hecht said. "Either that, or they need to find marvelous ways of optimizing 56K bit/sec circuits."

Threatening VSATs' role in networks will be emerging technologies such as Integrated Services Digital Networks, Fiber Distributed Data Interface and metropolitan-area networks.

Top vendors will also need to provide network management capabilities that are in line with the Open Systems Interconnection model so users can integrate VSATs into their enterprise networks, Hecht said.

Contel ASC and Scientific-Atlanta, Inc. are currently the leaders in network management, Hecht said, offering users the closest thing to OSI compliance. Tridom, a subsidiary of AT&T, is working to integrate its VSAT net management system, dubbed ClearLink Network Control System, into AT&T's Unified Network Management Architecture (UNMA), he said.

The Tridom product is now being tested for compliance with AT&T's Accumaster Integrator, a net management tool that enables customers to control and monitor management products from a variety of vendors through a central workstation. A UNMA-compliant version of the system should be released in the first quarter of 1990, according to John Yakemovic, manager of product planning for Tridom.

Contel and Scientific-Atlanta options

Contel ASC's VSAT management software, StarCom II, runs on a Digital Equipment Corp. VAX 3400 platform and offers users integration into DECnet and Transmission Control Protocol/Internet Protocol environments, according to Bob Ricker, director of applications engineering at Contel ASC.

Scientific-Atlanta offers users an interface to IBM's NetView and net management integration with X.25 switches that it resells from Telematics International, Inc.

Although neither Contel ASC nor Scientific-Atlanta are currently OSI-compliant, both companies cited plans to migrate in that direction.

Another key factor fueling the growth of the VSAT market will be a new generation of products. Emerging technologies such as ultra small aperture terminals, which may be as small as 6 inches in diameter, and phased array antennas, which are two-dimensional rectangular antennas that can be easily integrated into a building's structure, are included in the firm's growth projections.

One factor that has led to the acceptance of VSATs in certain markets is the geographic distribution of the dealership concept that characterizes industries in which VSATs are used most, Hecht said. The automotive arena accounts for 28.9% of VSATs in use today; retail, 24.8%; and financial, 23.2%.

Hecht predicted that the lodging industry, which currently accounts for 9.9% of the VSATs in use, will embrace the technology to a greater extent in coming years.

Franchise hotels will be able to benefit from confederations of users that employ shared hubs to reap economies of scale. Currently, corporate-owned hotel chains account for the bulk of VSATs used in the lodging industry.

One key factor resulting in backlogs experienced by users is that many vendors subcontract the work instead of doing their own installations. "When the bids get hot and it gets competitive, I'm afraid they may subcontract to anyone," Hecht said.

Sloppy installations can result in intermittent performance problems or even civil infractions for users if the work does not meet specifications set by governing bodies or building owners. ◘

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INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS AND FINANCIALS

Worth Noting

"The virtual network services market has really become competitive. We're seeing new tariffs filed almost every month by the major carriers, one after the other."

Kathy Clarke
Senior analyst
The Yankee Group
Boston

People & Positions

Hewlett-Packard Co. recently named **Robert Frankenberg** general manager of its newly created Information Networks Group.

HP created the Information Networks Group by combining its existing Information Networks Group, which focused on communications products, and its Information Systems Group, which involved desktop automation equipment.

Previously, Frankenberg served as general manager of the Information Systems Group.

Daniel Warmenhoven, who was general manager of the old Information Networks Group, recently left HP to take the position of president and chief operating officer at Network Equipment Technologies, Inc. in Redwood City, Calif.

Fibronics International, Inc. recently named **Thomas Goulding** senior vice-president and general manager of its North American operations.

Goulding will be responsible for marketing and sales, manufacturing, engineering and finance for the Hyannis, Mass., fiber-optic local-area network vendor's domestic business.

Previously, Goulding was vice-president of marketing for Mobile Data International, Inc., a Motorola Corp. subsidiary. ☐

Vendors go to new lengths to secure network orders

SmithKline Beecham recalls new cooperation.

By Gail Runnoe
Washington Correspondent

PHILADELPHIA — Pharmaceutical maker SmithKline Beecham marveled recently over the lengths to which US Sprint Communications Corp. went to snag a deal for a major net expansion.

"We've never had the same cooperation" from previous carriers, said William Caton, director of corporate telecommunications at SmithKline's U.S. division, based here. US Sprint got the order largely because of its flexibility and cooperation, Caton said.

The deal underscores a greater degree of cooperation between customers and suppliers in which vendors are willing to go to lengths previously unheard of to win new accounts and to satisfy and keep large national and multinational customers.

In SmithKline's case, the user "was the architect of the network and we were the implementors," said Allen Tothill, Atlantic-area vice-president for US Sprint's National Accounts Division in Atlanta.

"[Caton] really created it, and we had to work like heck to put it together for him," Tothill explained.

The plan involved replacing SmithKline's existing transatlantic voice, data and video circuits with a single 2.048K bit/sec E-1 channel to connect a hybrid network in the U.S to a private-line network in the U.K. E-1 is the European equivalent of T-1.

To meet the user's needs, US Sprint purchased a 50% interest in the Private TransAtlantic Telecommunications System, Inc. (PTAT) cable and worked out an alliance with Cable & Wireless PLC and its wholly owned subsidiary, Mercury Communications, Ltd., to provide the user with service in European sectors.

"Sprint was headed in that general direction," Tothill said, but the SmithKline network demands "made us move more quickly."

The U.S. network is provided solely by US Sprint and links 11 locations via private lines and more than 50 locations on a Sprint Virtual Private Network. The U.K. network, which links 17 locations, comprises private lines supplied by British Telecommunications PLC and Mercury Communications.

Together, US Sprint and Cable & Wireless will provide the transatlantic E-1 circuit over PTAT,

(continued on page 10)

INDUSTRY BRIEFS

British Telecommunications PLC last week announced the completion of its acquisition of the Tymnet value-added network from **McDonnell Douglas Corp.** for $355 million ("British Tel snaps up Tymnet, other assets," *NW,* Aug. 7).

The international network will operate as a new wholly owned British Telecom subsidiary in San Jose, Calif., called **BT Tymnet, Inc.** Mark Baker, previously marketing director of British Telecom International, was named president and chief executive officer of the new subsidiary.

BT Tymnet will support all of the existing Tymnet offerings, including OnTyme electronic mail services, Payment Systems credit card processing services and EDI*Net, an electronic data interchange service.

British Telecom will also meld its Dialcom, Inc. electronic messaging subsidiary into BT Tymnet. While details are scant as to how Dialcom will be merged into BT Tymnet, a British Telecom spokesman said work will proceed on integrating the Dialcom and OnTyme messaging services. These offerings are already X.400-compatible, so messages can be sent from one system to the other, he said.

Citing costs related to its acquisition of Apollo Computer, Inc. and the San Francisco earthquake, **Hewlett-Packard Co.** recently reported slight earnings gains for its fourth quarter and fiscal year ending Oct. 1. HP, which is based in Palo Alto, Calif., reported earnings of $246 million for the fourth quarter, up about 1% compared to $243 million in earnings the year before. Revenue grew to $3.4 billion for the fourth quarter, up 25% from $2.7 billion in last year's fourth quarter.

(continued on page 10)

Liberty Financial's Marilyn Finn

COM/Energy's Kerry Overlan

Users debate newer roles with suppliers

Both sides agree they must foster closer working relationships to meet changing user objectives.

Network users and vendors often don't see eye to eye, but when Network World *brought several together recently, we found they do agree that their relationship with each other is changing.*

Users are beginning to dictate terms and conditions of new services and products, while vendors are more willing to respond to the user influence because of tight market conditions.

Network World *Senior Editor Bob Brown met recently with Marilyn Finn, network manager at Liberty Financial Services, Inc. in Boston, and Kerry Overlan, director of telecommunications at COM/Energy Services Co. in Cambridge, Mass., to get their views on the evolving client/vendor relationship.*

Glenn Swift, sales vice-president for Northeast national accounts at AT&T in Lexington, Mass., and Bob Stearns, vice-president of corporate marketing and business development at Codex Corp. in Canton, Mass., offered views from the supplier side.

Do you see the relationship between users and suppliers changing, and if so, how is it changing?

Swift: There are changes occurring. It has to do with the changing view of information technology and how it has evolved in the last few years. Information technology is now being viewed as an asset, not just an operating cost. Given that, the roles have to change, and vendor/client partnerships are emerging because the key is going to be to understand the applications, the customer and the technology.

Stearns: I agree with Glenn entirely. Information systems has become a strategic element in many of our customers' businesses. I think that from our point of view, we have begun to understand customers' businesses much more specifically in terms of exactly what that business is trying to offer its user base.

I think it is essential that the vendor and the customer be able to talk to each other — with the common understanding that is far more specific than it has been in the past — about what we are trying to accomplish together.

Overlan: I agree with the statements that technology is moving toward more of a strategic level than just performing at an operational function. But I don't see the relationship changing that dramatically.

What a user wants an equipment supplier to do is pretty much what we've always wanted him to do — that is, to support the product, make sure it runs well and make sure it has the features we need to perform what we want to perform in the business.

How important are intervendor relationships to you?

Finn: Very important. Because if one vendor can't supply us with something, then one of the other vendors they're dealing with should be able to step in with the solution. You should look for complementary skills and services in vendor relationships.

Stearns: We will OEM services and products from other vendors if that's what the customer needs. We are designing our business essentially so that we will never have to say no to a customer, so that we can configure a constellation of relationships and, therefore, offer a system as either a prime supplier or as a subcontractor.

(continued on page 10)

Vendors go to new lengths to get orders

continued from page 9

which will be able to support five simultaneous compressed videoconferences, 500K bits of data transmission and 20 simultaneous voice paths.

When this new network is completed by the middle of next year, Caton said SmithKline should save about $250,000 annually on its transatlantic transmission costs, while increasing the network's data capacity tenfold, video capacity sevenfold and improving the quality of voice service.

However, Caton also wanted to be able to dynamically reallocate bandwidth on the network to support more data when voice and video requirements were low. He asked US Sprint and Mercury to install SmithKline-owned T-1 and E-1 multiplexers manufactured by Newbridge Networks Corp. at their U.S. and U.K. points of presence. Both carriers agreed to install the equipment and oversee its maintenance and operation.

US Sprint will also provide SmithKline with seven-digit dialing over the international net and voice compression from 64K bits to 32K bits.

"This is the first time Sprint has provided these services," Tothill said, but added that the company will extend them in the future to other customers with similar needs.

Caton said the network services it will obtain from US Sprint did not require technical innovation as much as they required the extension of US Sprint software into the U.K. through the carrier's alliance with Cable & Wireless.

"What we're doing is using all of the Sprint, Cable & Wireless and Mercury technologies and services to support our corporation," Caton said. "It means that we use them to their fullest potential and that they have agreed to do some things over and above what they normally would have done.

"We've influenced their product development and the way they handle their international communications capabilities," he said.

Caton explained that, as a general rule, SmithKline shies away from using unique custom-designed technologies.

"Our goal is to be on standard offerings," he said. "Even though we may put in something special right now, we would expect it to evolve into a standard product on an as-soon-as-possible basis . . . . We don't want to be out there on the limb by ourselves watching it get sawed off," he said.

Caton said he believes the cooperative relationships adopted by many companies and vendors today have been mandated by the complexity of networks. "In general, this has forced major corporations like ours to form alliances and partnerships with their vendors. Without these relationships, it's difficult to make use of a lot of technological advances," he said.

Tothill said working with a customer the way US Sprint has with SmithKline helps the carrier increase its expertise and solidify its relationship with the user. "The bottom line is that if we're not innovative, somebody else will be," he said.

Industry Briefs

continued from page 9

HP attributed its limited earnings growth during the fourth quarter to several extraordinary events. The company took a $6 million charge against earnings as a result of increased employee payouts under its profit-sharing plan following its acquisition of Apollo. HP's earnings also were negatively affected as a result of incorporating Apollo's operating results into its own.

Furthermore, HP took a $9 million charge against earnings as a result of cleanup and repair costs at its facilities that were affected by the earthquake.

For the fiscal year ended Oct. 31, HP reported earnings of $829 million, up 2% from $816 million last year. HP's earnings would have risen 12% compared to last year if not for the effects of the Apollo acquisition, the company said. HP reported revenue of $11.9 billion for its 1989 fiscal year, up 21% from revenue of $9.8 billion last year.

Users debate newer roles with suppliers

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Swift: I think a new phenomenon, at least at AT&T, is that we aren't going to do it all by ourselves anymore. We will go out and strike an alliance with somebody else.

Overlan: I think the question is still unresolved in terms of looking at other vendors and their relationships. What's new are the voice partnerships.

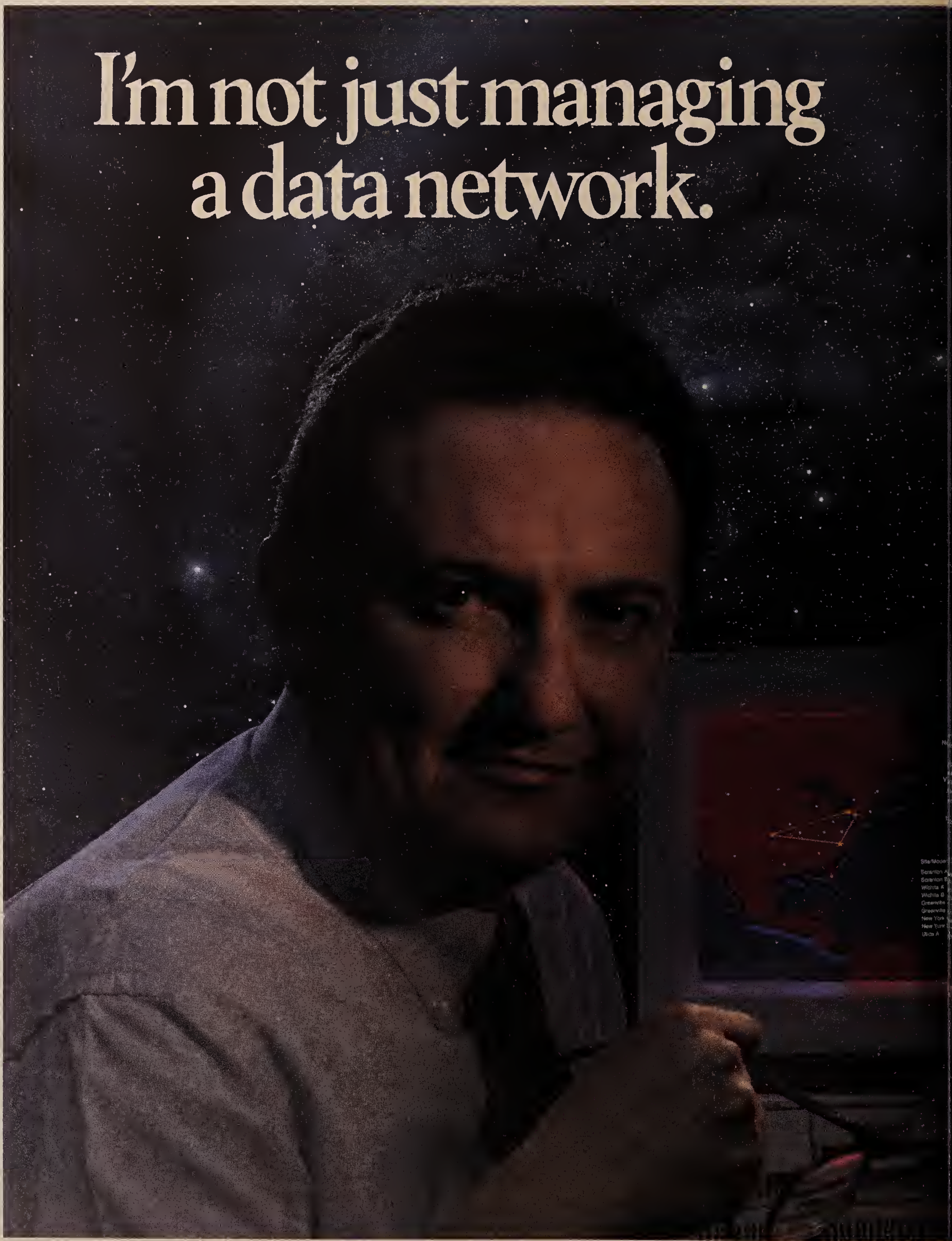
We do business with a large maker of T-1 multiplexers which, incidentally, is not Codex. We certainly were very determined to ensure that this vendor's equipment would agree with our IBM, DEC and Macintosh systems, and with anything else we had hanging off our network.

Today, when you're buying a PBX, compatibility is important — between equipment *and* services. Perhaps, on a short-term basis, it's a replacement for standards. Then you don't have to worry about compatibility between PBXs or central offices.

Are users influential in the development of vendors' products?

Stearns: Speaking from the vendor point of view, user product influence has changed or at least evolved a lot over the last few years.

Every new product and service idea begins with a direct customer. I don't think anything really comes out of left field anymore. And if it does come out of a laboratory concept, we will immediately go in and research with the customers to gauge their reactions. We rely upon focus groups,


I'm not just managing a data network.

not only during the product planning stage, but once it is ready to come to market, just to make sure we have it right.

We also have a users forum, and we get our users together on a regular basis to get reactions from them. I think it is woven into our culture that customer needs are paramount.

Overlan: With regard to users groups, although you may not be at General Motors, you are a member of a users group, which as a whole carries weight. It's true, though, that your influence could be disproportionate to other members in the users group.

Stearns: You haven't really learned about your customer until you have been beaten up by him from time to time. That is really when you find out what you're good at and what you're not so good at.

In your opinion, which users groups carry clout?

Swift: I think the most useful users groups, at least for us, are drawn along product lines.

Our 800 services users group recently proposed a new capability: an assurance program to 800 users that we will have their service back, regardless of the problem, within an hour [of the failure]. That was their idea, and we implemented it. It's a great example of users influencing the development process.

Stearns: Other important users forums that are not usually thought of as users forums are the standards organizations.

They tend to be populated pretty heavily with vendors, but I think it's imperative that users spend time in those forums because that's ultimately going to shape the equipment and services that you are able to buy in the future.

AT&T's Glenn Swift (left) and Codex's Bob Stearns.

Kerry, does your company get involved in standards organizations?

Overlan: No. It's kind of an esoteric little field. It's pretty tough to convince your boss you should go to Honolulu to make sure that Level 4 on the OSI standards is to our liking.

Generally, a lot of us feel that standards, to some extent, are a market value. That is, if IBM for instance, could enforce an SNA standard I'm sure they would enforce it. If there is enough competition to enforce an Open Standard Architecture — which there seems to be now — then we'll move toward open standards. For most of us as users, our focus is generally elsewhere.

From a personal point of view, I think standards will be more dictated by our market.

Swift: It's my perception from AT&T that you clearly don't have to be part of a users group to influence our behavior. I think that goes back to the opening discussion about relationships. It is very important that you have a strategic relationship with clients, but you won't have that relationship very long if you aren't responsive to their needs.

One sector that vendors are differentiating themselves in is the services market. What should users look for in after-the-sale service offerings?

Finn: Promptness. If there is a hardware failure, we want the hardware replaced ASAP. We also need someone you can call and say, "Hey, I need your help. What can you do for us?" No questions asked. Someone who takes total responsibility for the service side.

Stearns: At Codex, we are looking to eliminate the need for remedial repair and maintenance entirely. That is our design goal at this point.

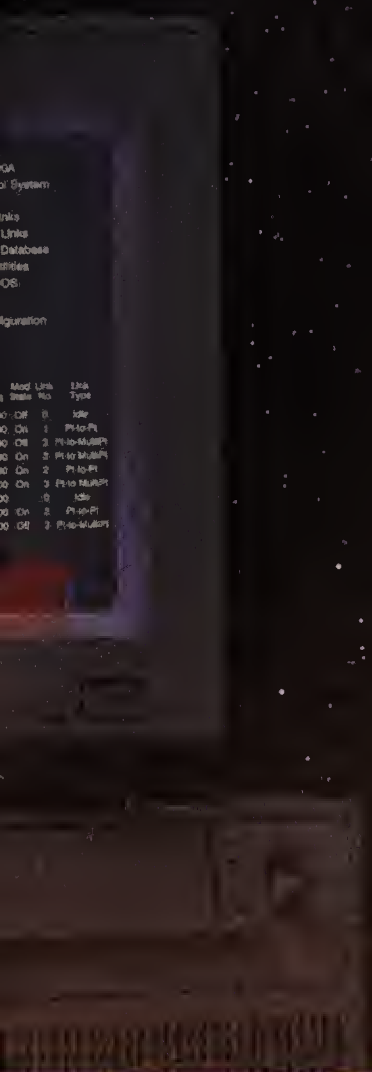
We have a program called Six Sigma, which, incidentally, won the Baldridge Award two years ago.

Our goal is to reach the point where our equipment failure rate in the field does not exceed more than 34 instances per million events. That is a very challenging statistic.

We are not doing this just to be good guys. We are doing this because remedial maintenance is expensive for both of us. We are also doing it because the cost of service has run into some very large numbers that most vendors would prefer to invest in new products and new services rather than fix something that just didn't work.

(continued on page 61)

I'm helping to insure that the computers stay up when the fiber is down.



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SOME FRANC ADVICE ON TRANSATLANTIC LEASED LINES

Monthly Cost for 64 Kbps Leased Lines and Networks

Satellite Service	Swiss PTT	British Telecom	Belgium RTT	Dutch PTT	German Bundespost	Mercury U.K.	**France Telecom**
U.S. to Europe and Intra-European Network	46.394	45.305	44.370	43.695	42.029	41.492	**40.198**
Intra-European Network	37.472	37.016	35.540	35.006	33.112	33.627	**32.288**
U.S. to Europe	8.922	8.289	8.831	8.689	8.917	7.865	**7.911**

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CARRIER SERVICES, CENTREX, CPE, WIRING SYSTEMS AND BYPASS

Worth Noting

AT&T Network Systems Group estimates that 1,200 of its 5ESS digital central office switches and 1,500 of its 1AESS analog switches are currently in use in the U.S.

Carrier Watch

MCI Communications Corp. recently activated its second north-south fiber-optic route in California, a 485-mile run that will serve numerous new cities and function as a backup to the carrier's main path. MCI said the two routes combined can support as many as 127,000 simultaneous calls. The new fiber link will enable the carrier to provide digital services to users in the California cities of San Mateo, San Luis Obispo, Santa Monica, Canoga Park and Thousand Oaks.

The Port Authority of New York and New Jersey recently awarded Teleport Communications Group a $15 million contract to build and run a new voice network serving Port Authority terminals and transportation facilities in the two states.

A Northern Telecom, Inc. Meridian SL-100 high-end digital private branch exchange at the World Trade Center will anchor the network, which will be brought on-line in late 1990. Teleport Communications, a Staten Island, N.Y.-based bypass service provider, will link the SL-100 to the authority's remote switches using its regional fiber-optic network; however, the firm may have to install some additional fiber.

The new net will connect Port Authority offices at the George Washington Bridge and Bus Station, the Lincoln Tunnel and Port Authority offices in Jersey City, N.J. Teleport Communications, which will serve as the primary vendor on the project, has chosen Centel Communications Systems, Inc. as the lead subcontractor for the engineering and installation phases.

State regulators hold the line on LEC rate increases

Only five of 21 rate hikes approved this year.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — State regulators held a firm check on rate increases this year, approving only a small percentage of the millions of dollars of increases requested by the major local exchange carriers.

Twenty-one state public utility commissions completed rate cases this year, but only five allowed increases, according to a study issued last week by the Federal Communications Commission. The FCC compiles the study, which is updated quarterly, to track trends in telephone rates.

The study includes rate cases during the first nine months of 1989 for the regional Bell holding companies, United Telecommunications, Inc., GTE Corp. and Contel Corp. These carriers provide more than 90% of the nation's local telephone service.

Of the five states approving rate increases in 1989, the highest was a 3.2% increase for GTE South in Alabama; GTE asked for an 8.4% rate increase. Alabama regulators also ordered South Central Bell Telephone Co. to reduce its rates by 9.2%.

GTE South was also granted a 2.9% rate increase in West Virginia, although it had requested 8.2%. The three other states allowing increases were Idaho, Kansas and Montana.

Nationwide, state commissions considered $161.4 million in rate increases, but instead, ordered more than $362 million in rate decreases. The largest increase that was considered was an 81.2% revenue increase requested by GTE Southwest in Texas. Texas regulators ordered a 59.1% decrease instead.

Increases pending

Still at stake are $450.3 million in rate increases requested by local carriers in cases pending before regulators in 11 states. These states are: Arizona, Indiana, Michigan, Missouri, Montana, Nebraska, New Hampshire, New York, South Carolina, Utah and West Virginia.

The largest request is $359 million for New York Telephone Co. The increases will be offset by a reduction in wiring charges for customers. The end result would be a rate reduction of $367 million for the company.

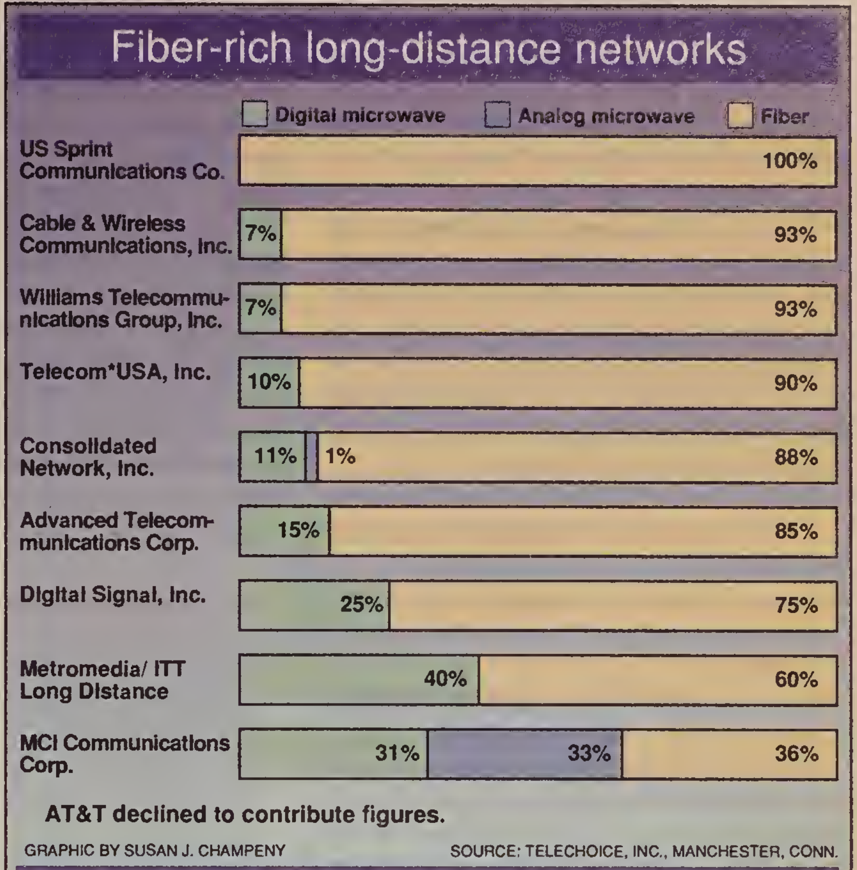
WASHINGTON UPDATE

BY ANITA TAFF

MCI takes grievance to state level. MCI Communications Corp. has widened its battle against AT&T's custom tariffs by filing a complaint at the state level against a pending Tariff 16 outbound calling plan for the state of Michigan. The service allows state government offices and university customers to pool traffic on a common Software-Defined Network (SDN).

MCI's complaint, filed earlier this month with the Michigan Public Service Commission, marks the first time MCI has challenged a Tariff 16 calling plan at the state level, but it might not be the last, according to a spokeswoman. MCI has also objected to the service at the Federal Communications Commission, causing the plan to be deferred until Dec. 7.

AT&T uses Tariff 16 for government customers whose business is put out for competitive bid. All but one of those filings to date have been for states. They include outbound calling plans for military bases in Hawaii, the commonwealth of Pennsylvania, the University of Texas at Austin and the state of Michigan, as well as an inbound calling plan for the U.S. Army Personnel Department in St. Louis. MCI decided to take its objections about the state of Michigan Tariff 16 to state regulators because it claims a significant portion of the service will be intrastate. MCI charged that under the Tariff 16 plan, AT&T will offer "rates significantly less than those imposed on other SDN customers," thereby discriminating in its pricing in Michigan. AT&T has not filed a tariff in Michigan notifying regulators of the rates it will charge government customers "to hide its practices from the [Michigan] Commission and the public," according to MCI. MCI asked the Michigan regulators to order AT&T to file a tariff outlining its Tariff 16 rates.



AT&T declined to contribute figures.

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: TELECHOICE, INC., MANCHESTER, CONN.

Mgmt. options pose virtual net dilemma

Although the top three carriers support some similar functions, other differences spell confusion.

By Bob Wallace
Senior Editor

Comparing and contrasting the net management systems the top three long-haul carriers offer for their respective virtual network services is becoming increasingly difficult because of the variety of functions and features each offers.

Although each of the systems enable users to generate reports and view statistics regarding service usage, they offer varying levels of access to the data bases used to maintain information about customers' virtual nets.

Users seeking basic features, such as the ability to change authorization codes and telephone numbers, can use any of the three systems. But companies that view network management as a strategic asset should try to determine which carrier places the greatest emphasis on network management in general, said Daniel Briere, president of TeleChoice, Inc., a Manchester, Conn.-based consultancy.

"AT&T is developing and extending its [Software-Defined Network] overseas, and US Sprint is concentrating on increasing network intelligence, but it's MCI that has thrown the most resources behind network management and made it a top priority," Briere said.

Another analyst agreed. "I just finished evaluating all three virtual network services in 13 areas for a large client and gave MCI the edge in commitment to virtual network management systems," said Thomas Walton, president of Walton & Walton Associates, a Richmond, Va.-based consulting firm.

But despite this commitment, both agree that AT&T's virtual network management system offers users the greatest degree of control. "The question here is which carrier lets you delve the deepest into your [virtual network] data base?" Briere asked.

"MCI's system lets you read network conditions but is very limited in terms of what changes you can make to that information. AT&T lets you go in as far as you want," he added.

AT&T's ESMS

AT&T's Expanded Service Management System (ESMS) enables customers to control SDNs from an on-site terminal linked to an adjunct computer at the central office over a 9.6K bit/sec private line.

With ESMS, the user can set up, change and delete authorization codes; authorize use of capabilities such as international dialing by caller or by group; and activate SDN's flexible routing feature.

Flexible routing enables customers to redirect traffic from one SDN site to another, making it possible, for example, to divert calls to other offices to accommodate time zones. A recording can notify callers that

(continued on page 14)

Mgmt. options pose virtual net dilemma

continued from page 13

their calls are being rerouted.

Before ESMS, SDN customers had to call AT&T's SDN Control Center in Atlanta to invoke these features. AT&T charges SDN subscribers a $100 monthly fee for ESMS, which became available in April.

ESMS supports five functions:

- **Service Management Systems** is an on-line system that enables users to manage and maintain an SDN data base. Users can access listings of station groups, authorization codes, screening groups, network numbering plans, alternate routing logs and user activity logs. Changes can be made in as little as 15 minutes.
- **Direct Access Trunk Test System** enables customers to monitor and test dedicated SDN trunks individually or by subgroup, location or bundle. The system helps users isolate problems with lines and equipment.
- **Customer Network Administration Reports** details the cost and performance of the SDN, segmenting usage by domestic or international origin and type of call, such as switched vs. dedicated and on-net vs. off-net. Other reports focus on long calls, calls made after-hours and incomplete calls.

> "MCI sees its future in offering more enhanced network management capabilities," Briere said.

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- **Customer Traffic Data Reports System** enables users to access critical network traffic information, including daily and weekly reports on dedicated access line use. The system generates exception reports when preset thresholds are exceeded and stores traffic data for up to 28 days for daily reports and up to three weeks for weekly reports.
- **Network Remote Access Monitoring System** enables SDN users to react to network abuse hours after spotting the problem. The system sounds an alert when preset usage thresholds are exceeded and enables the customer to deactivate calling privileges for that user.

MCI's Vnet systems

MCI offers two Vnet net management systems: Customer Information Manager and Network Information Management System.

Customer Information Manager allows the customer to create, view and revise customer-specific Vnet data from an on-site terminal connected to a Vnet data base via a private line. Customer Information Manager enables users to change seven- and 10-digit Vnet dialing plans, direct the path of calls using the direct termination overflow option, and activate and deactivate authorization codes.

"[Customer Information Manager] gives the customer near real-time access to the company's Vnet," Briere said. "US Sprint's [Integrated Network System Interface], by comparison, works on a batch basis, and updates are made on a daily basis."

Network Information Management System provides on-line access, through the Customer Information Manager terminal, to traffic data and near real-time operational and performance information. Both hourly and daily reporting information is kept for seven days and is provided to the user on the eighth day.

Common uses for the Network Information Management System include performance reports, trouble detection, trunk measurements and circuit status reports. There are 21 reports and histograms in total, all structured to permit easy analysis down to the dedicated access line group level.

"MCI sees its future in offering more enhanced network management capabilities," Briere said. The carrier wants to give users the ability to configure and manipulate their services at will through one terminal.

Announced in May 1988, Integrated Network Management Services (INMS) consists of six individual network management applications: operations management, trouble management, performance and planning management, configuration management, billing and cost management, and order entry and tracking management.

Users access these applications over a dedicated link using an IBM Personal System/2 outfitted with INMS software. Once their Personal System/2 is linked, users can monitor, manage and reconfigure their virtual private network.

US Sprint's INSITE

In July, US Sprint began marketing INSITE software for a personal computer that provides on-line access to the customer's Virtual Private Network data base.

INSITE is being rolled out in four phases, the first of which is available now. The initial version, INSITE 1, competes with AT&T's ESMS and MCI's Customer Information Manager and Network Information Management System, according to Briere.

The initial release offers features including the ability to change, activate and deactivate authorization codes, speed-dial numbers, monitor traffic statistics by location and assign features. INSITE also provides next-day access to daily and weekly traffic information.

INSITE II, due out in late 1990, will enable users to retrieve billing data archived by US Sprint, provide access to network-wide performance data and support customer-controlled reconfiguration. ◘

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Groups lobby New York telco for tariff covering diversely routed lines

See need to build greater redundancy in financial district.

By Wayne Eckerson
Staff Writer

NEW YORK — Two groups representing major banks here are calling for New York Telephone Co. to tariff a service that would enable users to reduce their dependency on a critical central office switch by obtaining diversely routed local lines at reasonable rates.

The Committee of Corporate Telecommunications Users (CCTU) and the New York Clearing House Association (NYCH) have initiated discussions with the New York Public Service Commission, which is expected to comment publicly on the issue before the end of the year, according to Kenneth Phillips, director of legislative affairs for the CCTU, an association of some of the nation's largest telecommunications users.

Currently, users can obtain diverse routing and other disaster backup services from New York Telephone on a custom basis, but those services can be prohibitively expensive, Phillips said.

In August, the CCTU and the NYCH sent a letter to New York Telephone officials expressing concern about the vulnerability of worldwide financial markets should an outage occur in New York Telephone's central office switch on Broad Street, in the heart of the city's financial district. The office supports traffic among many of the world's largest banks, brokerage firms and exchanges.

"A fire [in the Broad Street central office] could cripple the world financial community and seriously affect the U.S. economy," said Phillips, who is also vice-president of telecommunications policy for Citibank, N.A. here.

The Broad Street central office supports a good portion of the traffic carried by NYCH's Clearing House Interbank Payment System, an on-line electronic payments network that handles an average of $800 billion worth of transactions daily for 11 of New York's largest banks, according to John Lee, president of NYCH. The network currently supports 95% of all bank-to-bank payments made with U.S. dollars in the world, he added.

Officials at New York Telephone could not be reached for comment.

Reasonable cost

Phillips said New York Telephone should provide reasonably priced services that would enable New York's financial community to afford to build greater redundancy into their networks. Because these services are provisioned on a per-case basis today, the price is inflated and it takes significantly longer to acquire the service than tariffed services, he said.

New York Telephone should consider the provisioning of these services as a cost of doing business in the New York area, with its high concentration of multinational financial institutions, Phillips said.

"The local exchange carriers should be forced to absorb the cost of providing local service, no matter what the environment dictates. In the Western states, the [local exchange carriers] have to make special provisions to span the Rocky Mountains; in San Francisco, they have to ensure service is earthquake-proof; in New York, the financial community needs to have access to redundant circuits at [a] reasonable cost," he said.

New York Telephone currently charges a fee of several hundred dollars to determine how to engineer the provisioning of diversely routed local service. Users must then pay New York Telephone a fee for estimating the cost of implementing the service. In addition, New York Telephone is allowed to charge a special assembly fee that compensates it in lost hourly wages for dedicating its engineers to the project. "This gets to be very expensive," Phillips said.

The tariff would include services such as redundant routing, separate cable vaults and automatic rerouting through a backup central office. This last service would require the phone company to reserve extra capacity on its switches and maintain duplicate routing tables, which Phillips admitted was an expensive proposition. He said the special tariffed services would apply only to financial firms located here, not to firms in outlying areas where a disaster would have much less of an impact.

New York Telephone should not be allowed to pass along all the intrinsic costs of providing these services to customers that request them, Phillips argued. While the tariffed services should not be free, they should be provided at a reasonable cost. In compensation, New York Telephone should be allowed to add the cost of providing the services to its general rate base, he said.

The only alternative to such tariffed services is to allow competition into the local loop. "But Nynex [Corp.] vehemently opposes this," Phillips said.

Some brokerage firms, however, are looking to alternative carriers. The Securities Industry Association, which is building a private network for 26 brokerage firms here, might farm out half of its traffic to Teleport Communications-New York to give member firms greater route diversity and disaster protection, according to Gerard Higgins, senior vice-president of data processing and communications at Drexel Burnham Lambert, Inc.

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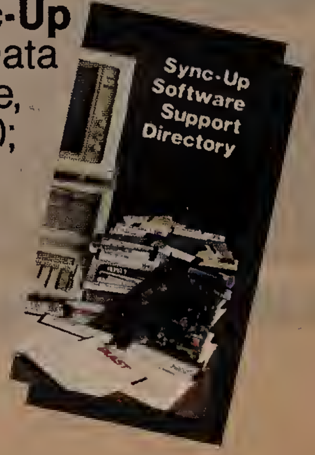

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See the FAXNeT Form on Page #59

DATA COMMUNICATIONS

PRODUCTS, SERVICES, ARCHITECTURES, STANDARDS AND NETWORK MANAGEMENT

Worth Noting

By 1995, there will be a $525 million market for OSI-based network management systems, up from $2 million this year, according to a recent study by Probe Research, Inc. of Cedar Knolls, N.J. The market for proprietary systems will grow from $35 million to $150 million in the same time period, the study forecasts.

Data Packets

Newbridge Networks Corp. recently announced Ethernet and token-ring local-area network bridges that can be integrated with its 3600 MainStreet Bandwidth Manager T-1 multiplexer.

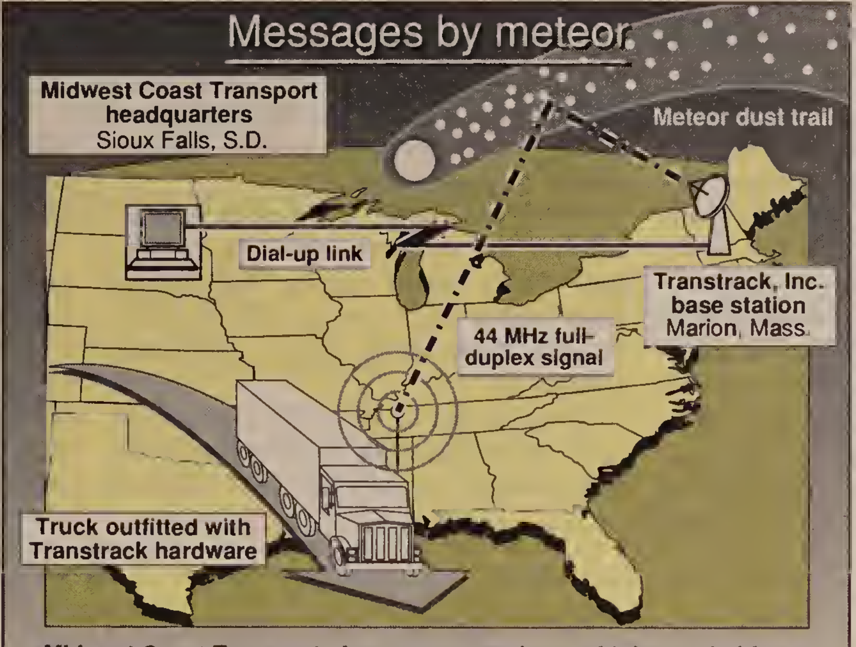
The 3203 MainStreet Ethernet and 3205 MainStreet Token Ring cards are modules that attach to the 3600 MainStreet Data Communications Processor card.

The 3203 is a media access control-layer learning bridge that uses the Spanning Tree Algorithm and links Ethernets across wide-area networks that use MainStreet multiplexers. The 3205 is also a learning bridge and is compatible with IBM Token-Ring Networks and other IEEE 802.5-compatible token-ring nets. It supports transparent and source routing.

Both bridges are priced at $2,500 and will be available in April.

Newbridge also announced its Fast Frame Switching strategy, which is the company's statement of direction to integrate products based on packet and frame relay switching with its circuit-switched multiplexer family.

Newbridge also revealed that it has signed a contract with Bank of America National Trust & Savings Association to provide an international voice and data network linking 35 sites in 28 countries, including sites in Europe and the Far East.


Messages by meteor
Midwest Coast Transport headquarters Sioux Falls, S.D.
Meteor dust trail
Dial-up link
Transtrack, Inc. base station Marion, Mass.
44 MHz full-duplex signal
Truck outfitted with Transtrack hardware

Midwest Coast Transport plans to communicate with its truck drivers from a single dispatch center using a data communications system that bounces radio waves off trails of meteor dust.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: MIDWEST COAST TRANSPORT, INC., SIOUX FALLS, S.D.

MCT hits the dusty trails of meteorites with new net

Trucker uses novel approach to signal drivers.

By Paul Desmond
Senior Writer

SIOUX FALLS, S.D. — Midwest Coast Transport, Inc. (MCT), a nationwide trucking company based here, has signed on to test a mobile data communications system that bounces radio signals off trails of meteor dust in the earth's atmosphere.

With the system, dispatchers here can transmit short messages to small terminal display units aboard trucks to pass instructions on to drivers. Likewise, drivers can send messages back to the dispatch center, obviating the need to phone into headquarters.

The system, offered by Transtrack, Inc. of Marion, Mass., also sends truck position data, which is derived using the government's Loran-C radio network.

Transtrack's system is an alternative to mobile data communications packages offered by vendors such as Geostar Corp. and QUALCOMM, Inc. Both of those vendors offer services that use satellites to reflect radio signals. Instead of bouncing its signals off satellites, Transtrack takes advantage of meteor dust trails, which are sand-sized particles that enter the earth's upper atmosphere. According to Transtrack, billions of the particles enter the atmosphere daily, leaving a trail that lasts only a few seconds but acts as a reflective layer for Transtrack's low-frequency radio transmissions.

The technology has been used by the U.S. and other governments for various communications applications for about 30 years. But only with the advent of microprocessors has it become fast enough and inexpensive enough to meet the needs of the trucking industry.

Since there are no satellite transmission costs, Transtrack can offer its service at prices far below those of its satellite competitors. The Transtrack system costs about $2,500 less per truck than its satellite alternatives, said Tom Burns, director of the quality process at MCT.

MCT, which operates 600 trucks in 48 states, opted to test the Transtrack system on 10 trucks after rejecting a satellite-based offering from an unspecified vendor, Burns said.

"We didn't get the utilization out of it [that] we thought we might," Burns said of the satellite tracking and communications system. "It was something that sat in the corner nobody used."

Under that setup, data from the satellite network came into a stand-alone personal computer. This forced dispatchers, who work at terminals attached to an IBM System/38 minicomputer, to get up from their terminals to use the personal computer.

Transtrack uses a personal computer to send and receive messages, but its package includes software that converts data into an ASCII format acceptable to the System/38, said Tim McCoy, an MCT programmer.

When a dispatcher wants to send a message from the MCT data center here, the message is entered into an IBM 5250-type terminal attached to the System/38. It is then sent to the personal computer, which dials up a Transtrack computer in Marion. From there, the message rides a 40-MHz radio signal, which is bounced off the meteor dust trails.

The message is received on the truck by an antenna attached

(continued on page 18)

AT&T fractional T-1 to supplant aged DDS

Carrier will offer incentives to lure customers.

By Jim Brown
Senior Editor

BASKING RIDGE, N.J. — AT&T's Accunet Spectrum of Digital Services (ASDS), an interexchange fractional T-1 offering that enables users to lease individual 64K bit/sec DS0 channels on carrier-supported T-1 lines, will likely be the beginning of the end for the carrier's Dataphone Digital Service, analysts said.

AT&T is clearly positioning ASDS to replace the older Dataphone Digital Service, which has a top channel speed of 56K bit/sec. To lure customers to the fractional T-1 service, AT&T is pricing a 64K bit/sec digital ASDS circuit significantly below a 56K bit/sec Dataphone Digital Service circuit (see chart, page 18) and is promising to deliver more network management information with ASDS than with Dataphone Digital Service.

Migrating Dataphone Digital Service users to ASDS will enable AT&T to dismantle its dedicated Dataphone Digital Service net, which is more costly to operate than the switched telephone network that supports ASDS.

"It seems what AT&T is doing is abandoning [Dataphone Digital Service] and putting more emphasis on this Spectrum of Digital Services," said Steve Sazegari, senior industry analyst with Dataquest, Inc., a market research firm in San Jose, Calif.

Dataphone Digital Service is not likely to disappear overnight because it still offers users higher performance than ASDS. For example, AT&T guarantees that a typical 1,000-mile Dataphone Digital Service circuit will be

(continued on page 18)

DDS vs. ASDS

Rate for the interexchange part of an AT&T Dataphone Digital Service circuit vs. a comparable AT&T Accunet Spectrum of Digital Services circuit.

Circuit miles	DDS 56K bit/sec	ASDS 64K bit/sec
25	$425.50	$143.98
300	$1,267	$344
1,200	$2,641.40	$632

SOURCE: AT&T, BASKING RIDGE, N.J.
GRAPHIC BY SUSAN J. CHAMPENY

DATA DIALOGUE

BY JOE MOHEN

Multiple SNA routing not business as usual

Shortly after we first started using telephone lines to transmit data, the need arose to send several users data over the same line. Recent technological improvements are changing the way this is done.

To understand what is new, we first have to understand some history. In the 1960s, data communications lines were essentially dedicated to one user at a time. The 1970s brought nodes that could service more than one user at a time — for instance, terminal cluster controllers or remote job entry (RJE) stations with three printers. With the arrival of these types of devices, IBM had to architect a method under its Systems Network Architecture to serve multiple users over a single line.

Its answer was multiple logical units. The node, such as a cluster controller or RJE station, would be considered one physical unit, yet there could be more than one logical unit supported on the line, with each logical unit representing a user or a process to the network. Basically, what IBM did was design a data transmission header that indicates the different addresses data is destined to reach.

Multiple logical units were designed for the "program-to-terminal" communications that characterized that era. There was one logical unit per dumb terminal, per user or per printer. The only downside to multiple logical units was that they had to be defined statically, meaning a user had to forecast how many

(continued on page 60)

Mohen is a Systems Network Architecture specialist and consultant based in New York.

AT&T fractional T-1 to supplant aged DDS

continued from page 17

available 99.95% of the time, meaning it will only be out of service 4.4 hours a year. AT&T can now guarantee that a 64K bit/sec ASDS circuit will be available 99.75% of the time, meaning it will be out of service no more than 21.9 hours a year.

In addition, AT&T guarantees that data being retransmitted to correct errors in the original transmission will be received error-free 99.79% of the time on a Dataphone Digital Service circuit. The rate with an ASDS circuit is 99.75%. This performance advantage may not last for long since AT&T said ASDS performance will be comparable to or better than Dataphone Digital Service within the next few months.

"I've got to believe that given the price difference and the fact that customers will get equally comfortable with ASDS over time, users are going to have to be in love with [Dataphone Digital Service] not to make the transition," said Walter Kittredge, an AT&T district manager in charge of leased-line service marketing.

In addition to better performance, Dataphone Digital Service is currently more widely available than ASDS. In fact, ASDS is only available in 44 cities, while Dataphone Digital Service is available nationwide, Kittredge said. AT&T plans to make ASDS available in 100 cities by year end and in more than 400 cities by mid-1991.

Given Dataphone Digital Service's current advantages over ASDS, AT&T had to offer Dataphone Digital Service users more than just a lower prices as an incentive to switch. That incentive, analysts said, is the availability of additional net management information with ASDS.

"The way [Dataphone Digital Service] was originally designed, there honestly wasn't a lot of thought given to network management," said Bart Stuck, president of Business Strategies, a market research firm in Westport, Conn.

AT&T will enable users of its Accunet Information Manager service to reconfigure ASDS circuit routing and receive alarms when ASDS circuits fail or performance levels drop below established thresholds.

Even though AT&T is striving to make ASDS more appealing to users than Dataphone Digital Service, the one variable it has little control over is how users will access ASDS. Most local exchange carriers do not offer a comparably priced 64K bit/sec access line to ASDS' 64K bit/sec service. But all local exchange carriers offer a more expensive 56K bit/sec digital data service that can access either AT&T's Dataphone Digital Service or ASDS.

This lack of inexpensive access can wipe out any savings a user accumulates by converting the interexchange portion of a Dataphone Digital Service circuit to ASDS.

"When the user takes a look at what it is going to cost to convert from [Dataphone Digital Service] to ASDS, it probably will be a pretty straightforward calculation in terms of the interexchange portion," said Mary Johnston, a principal with Northeast Consulting Resources, Inc. in Boston. "But the local exchange piece of it is going to be a lot more involved, particularly for users with national networks."

Those users, Johnston said, must deal with several local exchange carriers, each of which can easily develop different ASDS access services with varying prices.

Percentage above the ASDS rate for comparable DDS circuit, including cost for local access.

Circuit miles	DDS circuit
25	257%
300	347%
1,200	411%

SOURCE: PACIFIC COMMUNICATIONS SCIENCES, INC., SAN DIEGO
BUSINESS STRATEGIES, WESTPORT, CONN.
GRAPHIC BY SUSAN J. CHAMPENY

All AT&T can do is request that local exchange carriers provide an ASDS-compatible service, such as a digital circuit supporting both 64K bit/sec and bipolar eight zero code substitution (B8ZS) line coding.

"If users really do get on the bandwagon for these fractional T-1 services and the local exchange companies don't provide the access, the local companies will just get bypassed," Johnston said.

Foregoing development of a B8ZS access service, local exchange carriers may put more effort into coming up with an Integrated Services Digital Network offering to provide access to ASDS.

"ISDN will do two things," Stuck said. "It will support all the bit rates encompassed by [Dataphone Digital Service], and it will be a switched access service to a private-line long-distance service."

This could also mesh with AT&T's ISDN plans, Stuck added. "AT&T is really gung ho on ISDN. Long term, AT&T wants to take everything to ISDN." ◪

MCT hits trails of meteorites with net

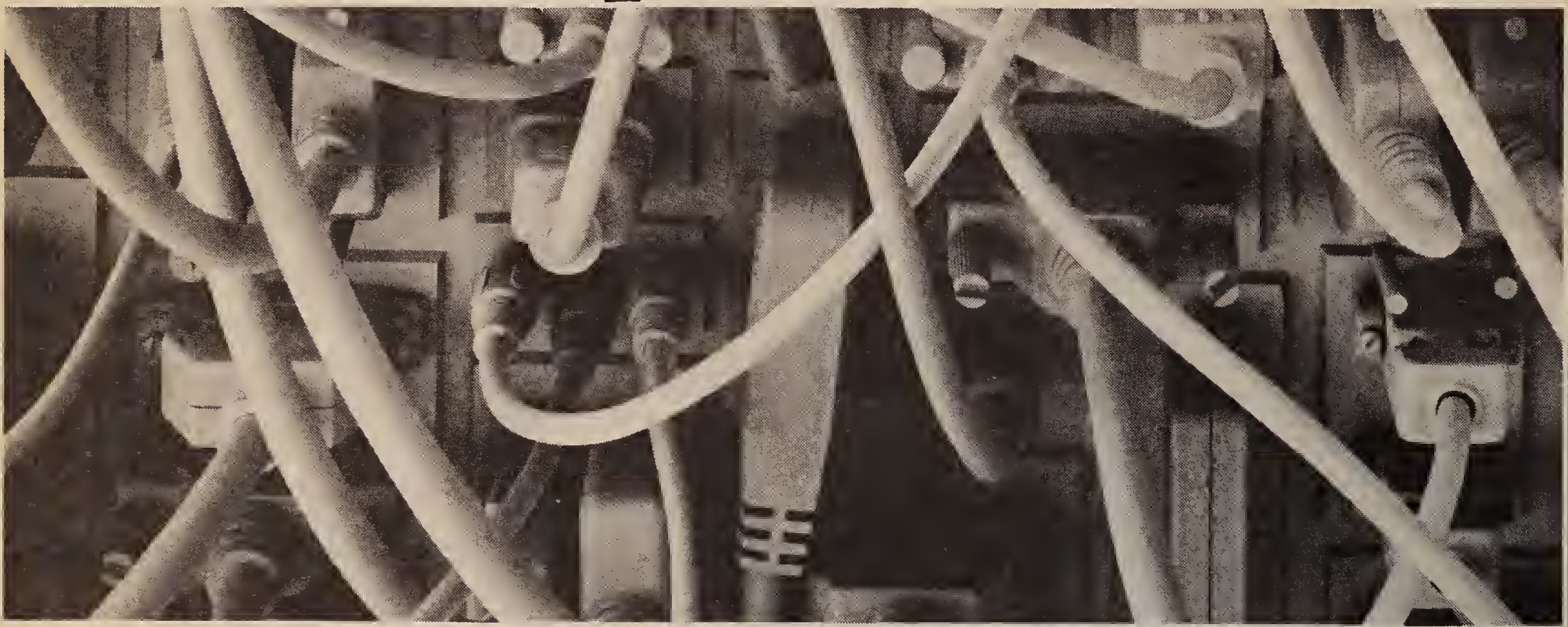
continued from page 17

to a transceiver unit, which in turn sends the message to the display unit in the truck's cab. Drivers can key in messages, which are relayed in the same fashion.

Because meteor dust trails are a less predictable means of communication than satellites, messages may take longer to reach their destination. Transtrack said most messages will be received within 10 minutes, as compared to a few seconds with satellites. But this delay is still far better than waiting for drivers to phone in, Burns said.

McCoy said MCT expects to install the first 10 units next month and test the system for two months before deciding whether to deploy it on a larger scale. ◪

Beat those multi-vendor technophobia blues.



The symptoms are easy to spot.

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LOCAL NETWORKING

PC AND TERMINAL-TO-HOST LANS, GATEWAYS AND MICRO COMMUNICATIONS PRODUCTS

Worth Noting

"There are few things more logical than for people to send and receive E-mail messages across a network. And yet, less than 2% of the installed base of 39 million microcomputers worldwide — only about 700,000 — have E-mail."

Rich Shapero
Vice-president, general manager
The TOPS Division of
Sun Microsystems, Inc.
Alameda, Calif.

Netnotes

Simpact Associates, Inc. recently introduced a family of token-ring local-area network interfaces that enable Digital Equipment Corp. MicroVAX computers to connect to Transmission Control Protocol/Internet Protocol-based IBM or IEEE 802.5 compatible token-ring LANs.

The TCI 2000 Series includes the TCI 2200, 2300 and 2400. The TCI 2200 interface contains communications TCP/IP software for file transfer and terminal emulation. The TCI 2300 enables a MicroVAX to perform program-to-program communications with systems on a token-ring LAN via an onboard IBM-compatible Network Basic I/O System interface.

The TCI 2400 incorporates an LU 6.2 interface, IBM's protocol for Advanced Program-to-Program Communications. This interface is targeted at application developers and end users that want to connect their MicroVAX to personal computers, minicomputers and mainframes for complete peer-to-peer communications over the token ring.

The TCI 2200 and 2300 are currently available in sample quantities; the TCI 2400 will be available in the first quarter of 1990.

Pricing on the three interfaces ranges from $7,900 to $17,150, depending on configuration.

New InBox E-mail packs may spur TOPS OS sales

Though not enough to boost firm out of niche mart.

By Laura DiDio
Senior Editor

ALAMEDA, Calif. — The E-mail packages that The TOPS Division of Sun Microsystems, Inc. recently announced are being hailed as some of the most comprehensive products on the market, but analysts said they probably will not be enough to propel the company out of its niche in the electronic mail arena.

However, incorporating the more robust E-mail packages into the company's TOPS network operating system will help spur the already healthy sales of TOPS and E-mail sales in general, analysts said.

TOPS' Rich Shapero

The two new E-mail packages, Version 3.0 of InBox and InBox Plus, run on Apple Computer, Inc. Macintoshes and IBM Personal Computers and compatibles.

The software comes bundled with the TOPS net operating system, but it is also being sold for the first time to run on networks based on Novell, Inc.'s NetWare, and Microsoft Corp. and 3Com Corp.'s LAN Manager ("TOPS unwraps new InBox E-mail package with broader net support," *NW*, Nov. 20).

The latest releases of InBox also incorporate new features, such as the ability to attach files to E-mail messages and an administrative messaging feature that lets users sort mail by date, subject and sender. TOPS said InBox can be installed by any user in about 10 minutes.

(continued on page 20)

TOPS allies with 6 firms to build InBox gateways

In conjunction with the recent introduction of new versions of its InBox electronic mail software, The TOPS Division of Sun Microsystems, Inc. announced alliances with six vendors to develop InBox gateways.

The gateways will enable users to access public and private E-mail systems — based on X.400 and the Simple Mail Transport Protocol (SMTP) — across many hardware and operating system platforms.

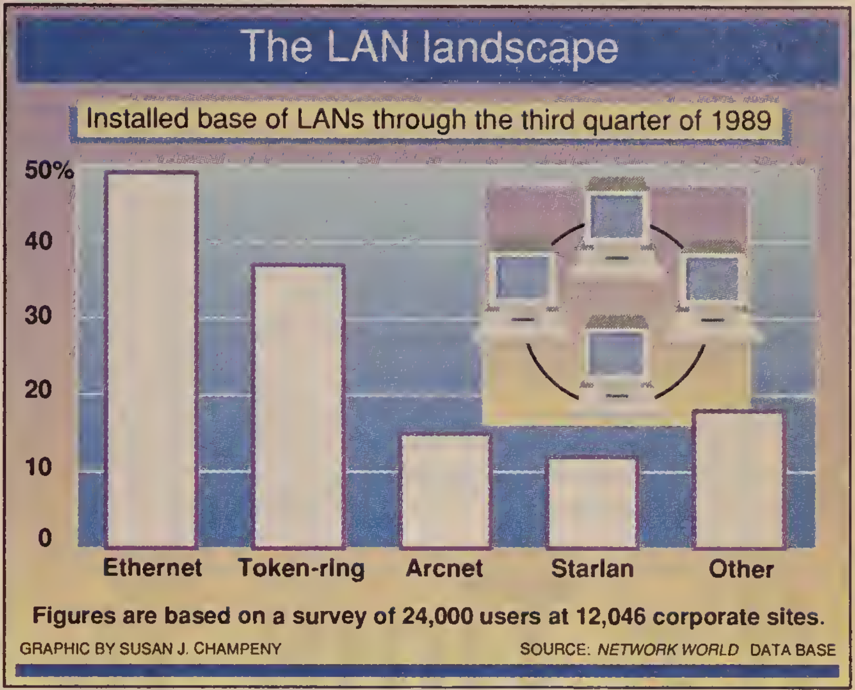
The new gateways, due out in the first quarter of 1990, will provide users with access to mainframe- and minicomputer-based private E-mail systems such as IBM's Professional Office System (PROFS), and Digital Equipment Corp.'s VMS Mail and All-In-1. The alliances include deals with:

- Alisa Systems, Inc. and Joiner Associates, Inc., which will develop VMS Mail and All-In-1 gateways.
- Retix, which will develop an X.400 gateway.
- Alcom Corp., which will provide gateways that enable TOPS users to exchange E-mail messages with Novell, Inc., 3Com Corp. and Banyan Systems, Inc. local-area network users, as well as a facsimile machine gateway and gateways to MCI Communications Corp.'s MCI Mail and Western Union Corp.'s EasyLink.
- DA Systems, Inc., which will deliver gateways for more than 50 E-mail services that use the company's DASnet internetworking mail product.
- Solutions, Inc., which will develop a fax gateway.

Additionally, TOPS announced alliances last August with StarNine Technologies, Inc. to provide InBox users with a gateway to SMTP-based E-mail and another with Soft-Switch, Inc. for gateways to PROFS and public E-mail systems.

TOPS InBox users will be able to combine addresses for users on other E-mail systems on multiple LANs and gateways into a single entry in their personal address books, said Rich Shapero, TOPS' vice-president and general manager.

— *Laura DiDio*



Figures are based on a survey of 24,000 users at 12,046 corporate sites.

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: *NETWORK WORLD* DATA BASE

Server-based NetWare applications debut

Novell's Comdex/Fall booth hosts independent software developers' NLMs for NetWare 386 1.1.

By Susan Breidenbach
West Coast Bureau Chief

SAN FRANCISCO — While Microsoft Corp. and IBM were stealing the network operating system headlines at Comdex/Fall '89 in Las Vegas earlier this month, industry leader Novell, Inc. was quietly ushering in the era of server-based NetWare applications.

In Novell's booth, a number of independent software vendors were demonstrating applications that run as NetWare Loadable Modules (NLM) under NetWare 386 1.1. These applications ranged from data base servers and tape backup utilities to electronic mail, accounting and computer-aided design packages.

NLMs are operating system modules that run server-based applications. They can be loaded and unloaded dynamically as required by network users, without rebooting the server, and they can run in the NetWare 386 file server itself or in separate, dedicated application servers.

NLMs are all linked to NetWare 386 through the same set of standard application programming interfaces (API) so it should be fairly simple for developers of complementary NLM applications to integrate their products. For example, an E-mail NLM could trigger a facsimile-server NLM so that a user could send a fax without exiting the E-mail application.

"With NetWare 386 and the NetWare Programmer's Workbench [a set of programming tools], Novell has given application developers the platform and the tools to move work group computing into its next major phase," said Norm Francis, vice-president of development in the Vancouver office of Computer Associates International, Inc.

"NetWare 386 will allow [Computer Associates'] AccPac network accounting systems to [employ] multiple special-purpose servers operating in parallel [construction] with workstations, [therefore] improving both computer and human efficiency," Francis added. Computer Associates has announced its intention to port some of its AccPac accounting software to the NLM platform.

Similarly, Oracle Corp., Informix Software, Inc., GUPTA Technologies, Inc. and XDB Systems, Inc. are all developing NLM versions of their data base engines, and Emerald Systems, Inc., Tecmar, Inc. and Vortex Systems, Inc. are writing tape backup software as NLMs.

NLMs actually represent Novell's second effort to get third parties to write server-based applications for NetWare. Goaded by Microsoft a couple of years ago, Novell developed a Value-Added Process (VAP) under NetWare 2.1X that provided a limited platform for building server-based applications.

However, VAPs were notoriously difficult to write, and only a handful have actually reached the market in the 18 months since NetWare 2.1 was released. Novell insists that NLMs, by contrast, are easy to develop.

ISICAD, Inc., which sells a DOS-based, CAD package called CADvance, and is developing NLMs that off-load some CAD tasks from LAN workstations clients to the server, agrees with

(continued on page 60)

InBox E-mail packs to spur TOPS sales

continued from page 19

"TOPS has a lock on the low-end local-area network market," said Doug Gold, manager of communications industry research at International Data Corp., a market research firm in Framingham, Mass. "InBox is a superior product, and I'm impressed with all the features and functionality TOPS has built into it. But, it's still going to be difficult for TOPS to play in [the] high end of the E-mail market."

"Forging alliances with third-party gateway vendors to build proprietary equipment doesn't necessarily give them instant credibility [as a supplier of] high-end or enterprisewide E-mail networking packages," Gold added.

Yet, Rich Shapero, TOPS vice-president and general manager, is counting on InBox to give TOPS, and the E-mail market in general, widespread credibility with the broad base of LAN users.

"InBox 3.0 and InBox Plus represent the second most important thing we've done since launching the original TOPS," Shapero said. "We're hoping all the new features in InBox will promote the same sort of explosive growth in the E-mail market that we've seen in LAN file- and print-sharing facilities."

Mum's the word

According to Shapero and industry analysts, E-mail packages haven't achieved broad penetration into the microcomputer market; less than 2% of microcomputer users worldwide use E-mail.

> "InBox is a superior product, but it's still going to be difficult for TOPS to play in [the] high end of the market," Gold said.
>
> ▲▲▲

The reason the E-mail messaging market hasn't taken off for microcomputers, according to Gold, is that many of the available packages have been difficult to install and use, and they typically run on only one hardware platform or network operating system.

"Until recently, users have had very few choices when it came to cross-system solutions, wide-area connections and gateways to other vendors' E-mail systems," Gold said.

"And from the end-user standpoint, E-mail has been fairly expensive, requiring a dedicated server and a systems administrator to install and monitor the package. That can work out to hundreds of dollars for each end user on the LAN," he added.

Besides its features and functionality, InBox boasts an affordable price per user: about $25 for the entry-level Version 3.0 of InBox in a 20-user configuration and about $10 to $20 for InBox Plus, which supports up to 100 users.

3Com currently leads the LAN E-mail market with an installed base of about 150,000 3+Mail packages, according to IDC statistics. But TOPS' is a very close second, according to IDC, and Shapero predicts his company will one day surpass 3Com as the No. 1 supplier.

"We've already got an installed base of over 100,000 TOPS users, and we're shipping an average of 20,000 TOPS networks a month, which includes InBox," Shapero explained.

Just as important for TOPS, the new InBox E-mail packages represent a surefire winner at a time when TOPS' status within the Sun organization is in doubt, IDC's Gold added.

TOPS and Sun engineers spent more than a year trying to merge Sun's Unix-based Network File System network with the TOPS net operating system, with no success, Shapero acknowledged. In the wake of that endeavor, several key TOPS executives left the company ("TOPS kills NFS plan, bolsters net software," *NW,* Aug. 7).

Additionally, Sun management decided to bring its own networking group in Billerica, Mass., back into the fold; that group had been reporting to TOPS' Shapero.

When it purchased Centram Systems West, Inc. (the company that marketed TOPS) in April 1987, Sun's original plan was to meld the two architectures and the companies.

Now, however, Sun and TOPS are separate entities, and sources within the industry say Sun is quietly shopping for a buyer for TOPS.

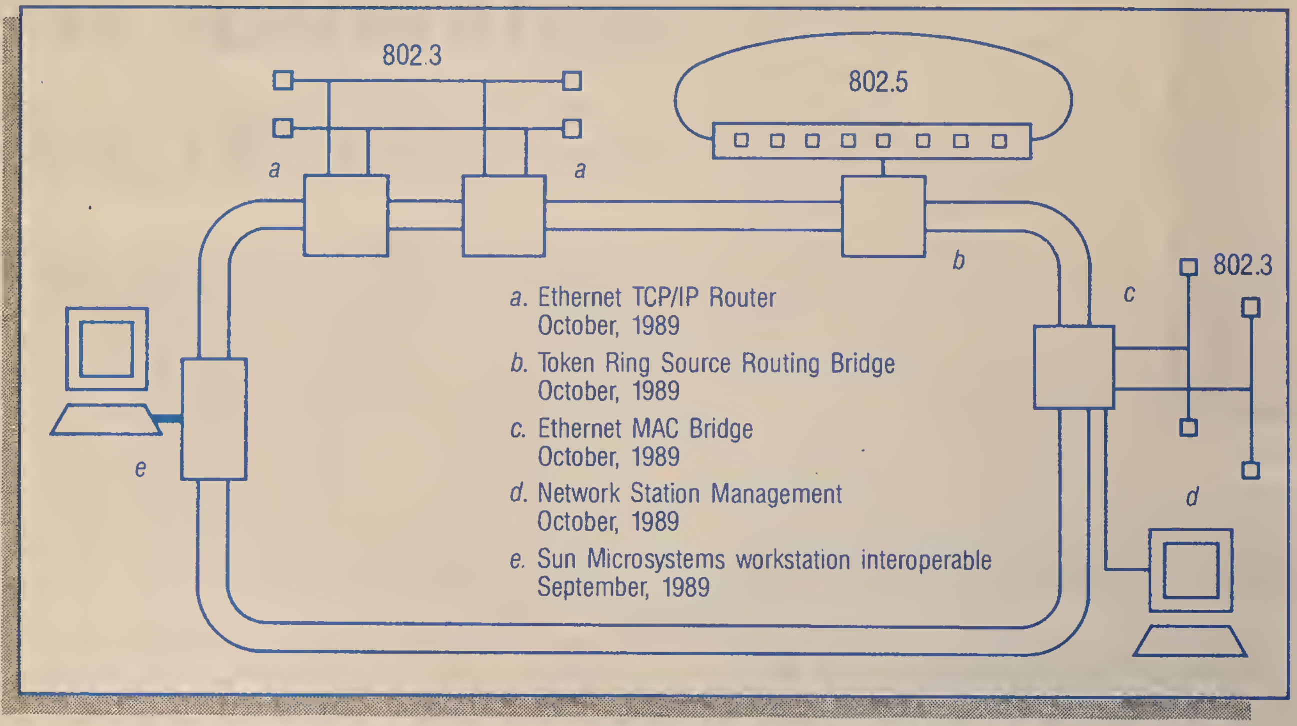
The new versions of InBox, plus TOPS' announcement of support for OS/2 earlier this year, make it an attractive acquisition. Sources within Sun and TOPS who asked not to be identified said that TOPS' management, led by Shapero, have been trying to work out a deal with Sun to buy the company.

Shapero declined to confirm or deny the rumors, saying only, "As an officer of Sun Microsystems, it's inappropriate for me to comment on that subject."

IDC's Gold, however, says such a deal makes sense.

"It would be a good move for [TOPS management] to buy TOPS from Sun because it would allow them to remain independent in the low end of the market. They've got a good product," Gold said. "But the question is, will they remain a niche player or achieve penetration into the larger system environment?" ◘

It's Time To Get Serious About FDDI.


802.3
802.5
a
a
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802.3
d
e
a. Ethernet TCP/IP Router October, 1989
b. Token Ring Source Routing Bridge October, 1989
c. Ethernet MAC Bridge October, 1989
d. Network Station Management October, 1989
e. Sun Microsystems workstation interoperable September, 1989

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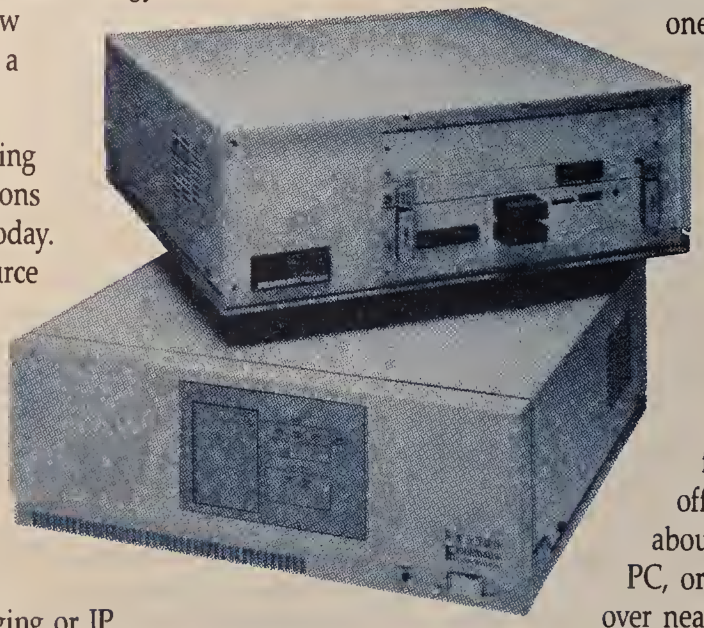

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See the FAXNeT Form on Page #59

MANAGEMENT STRATEGIES

MANAGING PEOPLE AND TECHNOLOGY: USERS GROUPS AND ASSOCIATIONS

Dialogue

Do you believe that AT&T should be freed from the regulations imposed on it because of its dominant carrier status?

“Freeing AT&T from its dominant carrier status would increase competition, which is good for users. What's happening now is that MCI and US Sprint are fixing rates at a certain percentage below AT&T's. That's not competition to me. I would rather see carriers base rates on what their actual costs are.

“I'm not concerned that AT&T would crush the competition in an unregulated market. GM and IBM both control large percentages of their respective markets, but that hasn't prevented other companies from competing.”

Norm Martin
Director
Office of Telecommunications Management
State of Maryland
Baltimore

“Releasing AT&T from the constraints of the Modified Final Judgment to compete on an even basis is a good thing. For example, AT&T is currently restricted in the way it can enhance its electronic mail service, AT&T Mail.

In an unregulated market, AT&T would be able to assemble a variety of services, such as extensive in-house data bases, to add to its electronic mail package. Currently, AT&T can only provide gateways to such data bases.”

E. Brian Cary
Director of technology support
American Bar Association
Chicago

“MCI and US Sprint are now large enough so that AT&T can't knock them around. Even without regulatory constraints, AT&T has so much bureaucracy that it won't be able to move fast enough to exploit market opportunities.

“With a small outfit, such as Telecom*USA, Inc., Rochester Telephone Corp. or Williams Telecommunications [Group, Inc.], I can sit down with their engineers to decide how to do something, and they'll go do it tomorrow. It takes AT&T six weeks just to find their engineers.”

William Gladden
Telecommunications manager
West Point-Pepperell, Inc.
West Point, Ga.

Users need new measures for evaluating IS projects

Wharton prof urges emphasis on ‘soft benefits.’

By Barton Crockett
Senior Editor

PHILADELPHIA — If you're trying to determine whether a major network project is worth the risk, you may want to bypass some traditional return-on-investment measures.

That's what Wharton Business School Professor Eric Clemons advises in two recent papers on strategic information technology investments.

The papers, titled “Making the Technology Investment Decision: Principles for Evaluating Strategic Opportunities in Information Technology” and “Making the Investment Decision: Evaluating Strategic Opportunities in Information Technology,” claim users often do a poor job of evaluating strategic information system initiatives because they pay more attention to quantifiable returns rather than so-called “soft benefits.”

Soft benefits include such intangibles as the ability to respond more rapidly to changing market conditions, improved customer service, higher product quality and the opportunity to enter new markets.

While difficult to quantify, soft benefits can give a company a competitive advantage, Clemons said. Firms that underestimate how information systems can improve their performance with soft benefits risk extinction in a rapidly changing business environment, he added.

“There is a significant danger that American businesses are not investing in the [information] systems they need,” Clemons said. “Part of the reason is that companies aren't evaluating the investment decision properly.”

(continued on page 60)

A risky endeavor

Risks associated with building strategic information systems

Technical:
The system is infeasible, given current technology.

Project:
The project is so large and complex that it overwhelms the information systems staff.

Financial:
Initial payoff estimates are incorrect, or costs run higher than expected.

Functionality:
The system is implemented correctly, but the initial design does not meet user needs, or the business environment changes and the system becomes inappropriate.

Environmental and systemic:
The new technology so dramatically shifts the business environment that the advantages expected from it vanish.

SOURCE: DEPARTMENT OF DECISION SCIENCES, THE WHARTON SCHOOL OF THE UNIVERSITY OF PENNSYLVANIA, PHILADELPHIA
GRAPHIC BY SUSAN J. CHAMPENY

GUIDELINES

BY SUNIL TAGARE

Better communications let firms farm out work

A new trend seems to be developing that could conceivably reshape the way business is done around the world.

Because of improvements in international communications facilities, particularly satellites and undersea fiber-optic cables, businesses are finding it easier to move white-collar jobs abroad.

The trend may have started about five years ago when American Airlines, Inc. moved some of its data processing operations to Barbados. One thousand workers on the Caribbean island now input accounting information into computers and transmit it by satellite back to the airline's computer center in Tulsa, Okla. Total cost savings by moving the work offshore is in the 50% to 60% range — a big competitive edge for the airline.

Among the white-collar jobs that seem most likely to be shipped abroad are those in software development, research, medical record keeping and accounting. Already, many of these jobs have been exported.

For instance, New York Life Insurance Co. processes its medical claims at a processing center in Castleisland, Ireland.

(continued on page 60)

Sunil Tagare is director of the underseas counsulting group at Kessler Marketing Intelligence Corp., a Newport, R.I.-based fiber-optics and communications consulting firm.

Hewlett-Packard's HP-TV broadcast control center in Palo Alto, Calif.

HP a pioneer in use of videoconferencing

High-tech giant Hewlett-Packard benefits from business television, videoconferencing networks.

By Wayne Eckerson
Staff Writer

PALO ALTO, Calif. — While most companies are just now beginning to think about video-based communications networks, high-tech giant Hewlett-Packard Co. has written the textbook on it.

For the past nine years, HP has been broadcasting television programs via satellite to hundreds of its offices throughout the U.S. and Europe. And in 1986, the company cut over a videoconferencing net that today links 19 U.S. and European HP sites.

HP's decision to pioneer the use of business television and videoconferencing was based on a business need, rather than a desire to showcase new technologies. With manufacturing sites and sales offices scattered throughout the world, HP needed a way to bring its people face-to-face without the delays or expense associated with physically transporting people.

“The [video networks] have filled a communications gap within HP,” said Peter Shultz, manager of communications for HP's business television group here. “Instead of waiting weeks or months to get the right people together, [we can] do it in a matter of minutes.”

HP developed its business television network, dubbed HP-TV, primarily to speed the delivery of information about new products and services, according to Bill Taylor, a manager in HP's corporate telecommunications group here. HP conducts about 250 programs a year on the satellite network, which supports one-way video and two-way audio.

Before HP-TV existed, it took the company three to four weeks to update its sales and service people about new releases, often with inconsistent results. “Now everyone gets the same information about a new product within three or four hours,” Taylor said.

HP-TV also broadcasts companywide training classes and other company information that needs to be shared among multiple divisions. Senior executives, for example, often make use of HP-TV to convey important messages about new company policies or new strategic directions. Previously, they would spend weeks flying from location to location making personal presentations, Shultz said.

HP-TV transmits programs to remote sites via a satellite uplink situated outside its broadcasting studio here. The analog signals are encrypted before being transmitted to a Ku-band satellite. Remote HP sites use a satellite dish located on their premises to pick up the signals, which are then decoded and displayed on a widescreen TV in special conference rooms.

Shultz said the cost of broadcasting equipment has fallen sharply, but it has been offset by the rising price of satellite transmission time.

Private video networking

Advances in technology have dramatically reshaped HP's videoconferencing net in the three years of its existence. What started out as a satellite-based network using T-1-equivalent bandwidth is now a terrestrial net that transmits full-motion, interactive video via two 56K bit/sec circuits.

Most of the bandwidth savings were made possible due to advances in the quality of coder/decoders (codec), which compress video signals for transmission across phone lines, Taylor said.

(continued on page 60)

"I suppose, Dorfman, in its broadest sense, you could call this networking."

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PRODUCTS & SERVICES

THE LATEST OFFERINGS FROM VENDORS AND CARRIERS

Worth Noting

See inside for:

- New version of Progress 4GL/RDBMS that supports the SPX protocol.
- Cogent introduces a line of Ethernet server adapters for PCs and EISA bus-based systems.

First Look

TCP/IP pack uses only 28K memory

TRW, Inc.'s Information Network Division recently introduced a software upgrade for its PC2001 TCP/IP package for MS-DOS personal computers. The software now only requires 28K bytes of random-access memory; the earlier version required 120K bytes.

PC 2001 Version 4 now complies with the U.S. Air Force's Unified Local Area Network Architecture procurement specification.

The product supports all standard Transmission Control Protocol/Internet Protocol applications, whereas the earlier version supported only Telnet and File Transfer Protocol. Version 4 also supports the Simple Mail Transfer Protocol.

The software upgrade, OS Connection Version 4, was made by porting TCP/IP code from FTP, Inc.'s PC/TCP software, which allows TCP/IP functions to run on the PC2001 card rather than the host, providing the memory savings.

The hardware and software package is priced at $670 and is available now.

TRW Information Networks Division, 23800 Hawthorne Blvd., Torrance, Calif. 90505; (213) 373-9161.

Hughes rolls out net monitoring program

Hughes LAN Systems (HLS) of Mountain View, Calif., formerly Sytek, Inc., recently released a net monitoring program for its LocalNet 2000 broadband network.

(continued on page 24)

Banyan ups capacity of server line

By Tom Smith
New Products Editor

WESTBOROUGH, Mass. — Banyan Systems, Inc. recently introduced a local-area network server based on Intel Corp.'s 80486 microprocessor that will support twice as many users as its previous high-end server, the CNS386.

The new CNS486 supports between 40 and 200 users, up to 24M bytes of dynamic random-access memory and up to 660M bytes disk memory, according to Fred Chaloux, vice-president of hardware products at Banyan.

"We're trying to take mini-computer-level applications, move them down to the server and off-load data manipulation to the personal computer as it becomes more powerful," Chaloux said. "This will give increased performance on the network, as opposed to a terminal-to-mini-computer configuration."

The server is optimized for use on networks running Banyan's VINES LAN operating system, which is based on Unix. It supports VINES-compatible data bases, notably Oracle Corp.'s Oracle Server for VINES, as well as distributed applications such as Banyan E-mail.

CNS486 has 10 interface slots, one of which is dedicated to the single-CPU board and another of which is dedicated to a memory board. Users can populate the remaining eight slots with a variety of interface cards. Up to four slots can be used for LAN interface cards, and two slots can be used for add-on memory boards.

For example, the server supports Banyan's wide-area interface card, the Banyan/Intelligent Communications Adapter, which supports a range of protocols, including asynchronous dial-in, X.25, Synchronous Data Link Control and High-Level Data Link Control.

LAN interface cards supported include those for token-ring, Ethernet and Arcnet LANs. The serv-

(continued on page 24)

PC call accounting pack supports PBXs, key systems

ATLANTA — Lanier Voice Products, a division of Lanier Worldwide, recently introduced call accounting software for use with key systems and private branch exchanges.

Lanier's CallWriter runs on MS-DOS-based personal computers with a minimum of 640K bytes memory and can connect to any PBX or key system via an RS-232 port.

When the telephone system is linked to a local personal computer running CallWriter, the phone system automatically sends call records after every 10 calls to the personal computer, where they are stored in random-access memory, according to the company.

By automatically taking reports at these intervals, users are assured that even in the event of a power outage, only a small number of call records would be lost.

The number of call records stored by CallWriter is dependent on the amount of memory in the personal computer. A microcomputer equipped with a 40M-byte drive, for example, can accommodate 250,000 call records generated by CallWriter, the company said. CallWriter runs in background mode, so the personal computer can run other applications without interruption.

The software can generate call reports under five categories: organization, company, division, department and extension. Call reports for a given extension, for example, would include the number of calls placed, date, time, carrier used, telephone numbers called and duration of calls.

In each of these categories, the system contains 46 standard reports that enable users to include specific categories of data on calling patterns according to their needs.

Those reports can also be tailored by users who purchase a package with an optional ReportWriter capability, which allows them to customize any of the standard reports. ReportWriter also lets users print the information in a variety of formats or insert it into a Lotus Development Corp. 1-2-3 spreadsheet.

A remote-site polling capability, known as Global, enables users from one site to dial into PBXs at remote sites and download raw calling data for conversion into a report format.

A basic version of the software, with all 46 reports included, costs approximately $500. A more sophisticated version, with the Global capability and a ReportWriter, costs $4,000.

Lanier Voice Products can be reached by writing to 1700 Chantilly Drive, N.E., Atlanta, Ga. 30324, or by calling (404) 329-8000. ◼

LAN E-Mail gateway provides host link

Product enables local net users to access IBM mainframes running PROFS and CMS software.

By Tom Smith
New Products Editor

VANCOUVER — Consumers Software, Inc. last week introduced software that enables users of its Inter-Network Courier electronic mail to communicate with users of IBM's Professional Office System (PROFS) or Conversational Monitor System (CMS).

The Network Courier Gateway for PROFS and CMS turns an IBM Personal Computer or compatible — using IND$ commands for IBM 3270 terminal emulation — into a gateway linking MS-Net-compatible local-area networks to IBM mainframes running CMS on top of VM or PROFS on top of VM and CMS.

CMS is a component of VM that lets users perform low-level messaging without the sophisticated calendaring and scheduling functions of PROFS.

PROFS, IBM's office automation package, is a superset of CMS.

Inter-Network Courier is a LAN-to-LAN E-mail package that operates on Novell, Inc., 3Com Corp., Banyan Systems, Inc. or any DOS-based LAN.

The new software will enable users to exchange mail, recipient directories, binary or text files, and, in the future, PROFS documents, between LANs and mainframes, the company said. The gateway will automatically perform translation between ASCII and EBCDIC.

"This is the first E-mail product that gives close interoperability with host-based systems," said Jack Grushcow, president of Consumers. Moreover, he added, it saves host storage.

The software has two components: one that runs on the personal computer and the other running on VM.

The microcomputer configured as the gateway requires a connection to the mainframe that supports 3270 file transfer. This connection can be through a token-ring network attachment, direct connection to a cluster controller or a Synchronous Data Link Control card with a synchronous modem.

Software features

The addressing scheme used by Consumers' gateway software provides seamless integration be-

(continued on page 24)

Esprit Systems releases two diskless workstations

Products to interface with Ethernet and Arcnet.

LAS VEGAS — Esprit Systems, Inc. introduced at Comdex/Fall '89 two diskless local-area network stations, one based on the Intel Corp. 32-bit, 25-MHz 80386SX microprocessor, the other based on Intel's 16-bit, 12.5-MHz 80286.

Both diskless workstations have built-in Ethernet and Arcnet interfaces.

The 80386SX machine, LANTerm 3, has 1M byte of dynamic random-access memory, expandable to 8M bytes on the main CPU board. The 80286-based machine comes with 1M byte of standard RAM, expandable to 5M bytes.

LANTerm 3 and LANTerm 2 come bundled with a Novell, Inc. NetWare boot chip that can be used to initialize the system across a NetWare LAN. A read-only memory cartridge allows users to install boot ROMs for Network Basic I/O System and Transmission Control Protocol/Internet Protocol LANs.

When equipped with an Ethernet module, LANTerm 3 and LANTerm 2 achieve Ethernet's full 10M bit/sec throughput by using a technique Esprit calls shared memory interfacing, which makes the Ethernet controller appear as a math coprocessor to the main CPU.

The Ethernet controller also has direct memory access to the main CPU, which means it can bypass the system bus to maintain peak performance.

LANTerm 3 and LANTerm 2 also support a 12-MHz or 16-MHz Intel 80387 coprocessor to speed mathematical computations in applications such as spreadsheets and graphics. This design enables both workstations to take maximum advantage of the multitasking capabilities in OS/2 environments.

LANTerm 3 can simultaneous-

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First Look

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Called **9020 Netmon V 1.2,** the program runs on a read-only memory cartridge that plugs into HLS' 5301 Router, which links to the LocalNet broadband network via an F-type connector. A 5301 used in this way is dedicated to the monitoring function and cannot act simultaneously as an interchannel router.

The network administrator controls data collection through a command menu displayed on an ASCII terminal attached to the 5301's RS-232 console port.

The 9020 provides real-time monitoring of channel activity and can also generate reports indicating percentage of channel utilization, various channel statistics and even session connect time so that individual users can be billed according to actual usage of network resources. The 9020 can also monitor and report on link-level, session and individual node activity.

The 9020 is priced at $1,500 per software cartridge.

Hughes LAN Systems, 1225 Charleston Road, Mountain View, Calif. 94043; (415) 966-7300.

New Progress RDBMS supports SPX protocol

Progress Software Corp. of Bedford, Mass., recently began shipping a new version of its Progress fourth-generation language and relational data base management system, called **4GL/RDBMS,** that includes built-in support for Novell, Inc.'s Sequenced Packet Exchange (SPX) protocol.

Other networking standards that Progress Software supports include Transmission Control Protocol/Internet Protocol and Network Basic I/O System. Progress users can employ these to distribute clients across a number of data base servers in a multivendor enterprise network.

According to Matthew Hickman, an application specialist at Financial Information Trust in Des Moines, Iowa, the built-in SPX support has reduced memory usage in workstations on NetWare networks running Progress applications. It also boosts performance by allowing the Progress applications to take advantage of the high-performance SPX protocol, he added.

A local net version of Progress, including SPX support, costs from $3,400 to $9,000, depending on the number of net nodes.

Progress Software Corp., 5 Oak Park, Bedford, Mass. 01730; (617) 275-4500.

Cogent intros three E-net bus master cards

Cogent Data Technology, Inc. unveiled a family of three 32-bit bus master Ethernet server adapters at the recent Comdex/Fall '89 trade show in Las Vegas.

All of the new adapters can be used in personal computers or in personal computers configured as dedicated network servers, said Mark Goodman, Cogent's marketing manager.

The **E/Master 32I** is a 16-bit Ethernet adapter that incorporates an Intel Corp. 32-bit LAN coprocessor chip. It features a common design architecture for Industry Standard Architecture (ISA), Extended ISA (EISA) and Micro Channel Architecture buses.

The E/Master 32I runs on any eight- and 16-bit ISA bus-based IBM Personal Computer AT or compatible, as well as all 32-bit EISA bus-based systems such as Compaq Computer Corp.'s SystemPro. The E/Master 32I will ship in the first quarter of 1990 and is priced at $895.

The **E/Master 32M** is a full 32-bit Ethernet adapter with a Micro Channel bus. It runs on all Micro Channel IBM Personal Computers and compatibles. The firm will begin shipping the product in the second quarter of 1990; pricing has not yet been set.

The third member of the family is the **E/Master 32E** for 80386 and 80486 EISA bus-based systems. The E/Master 32E will also ship in the second quarter of 1990. Pricing has not yet been set.

Cogent Data Technology, Inc., 175 West St., P.O. Box 926, Friday Harbor, Wash. 98250; (206) 378-2929.

Banyan ups server capacity

continued from page 23

er has drivers for roughly 35 third-party interfaces, Chaloux said.

The server uses the 80486 chip's floating point coprocessor and burst-mode memory operating features to achieve higher throughput rates than the previous generation CNS386 server.

The floating point capability allows functions such as multiplication and division to be handled by the processor instead of a separate chip. Floating point functionality also alleviates the need for separate controller and I/O functions to be performed by more than one processor.

Burst-mode operation accelerates interface card-to-host memory transfers. The company said this results in a 15% performance increase over non-burst-mode operation.

The CNS486, which comes with 8M bytes of main memory, has three disk storage capacity options. It costs $33,695 with a 146M-byte disk, $34,195 with 320M-byte disk, and $36,295 with 660M-byte disk.

The company also offers a 4M-byte Burst Mode Memory Add-On Board for $4,295 and an 8M-byte add-on board for $7,295.

The server and add-on boards are scheduled for shipment in mid-February.

Banyan will also offer a Burst Mode Memory Add-On Board to upgrade the CNS386 to a CNS486, which will cost $11,995. The board will be available in March 1990.

Banyan can be reached by writing to 115 Flanders Road, Westborough, Mass. 01581, or call (508) 898-1000.

Esprit releases two workstations

continued from page 23

ly execute as many as 16 smaller applications or eight larger ones, according to Ernest Wassmann, Esprit Systems' director of product marketing.

All of those applications can be displayed simultaneously in a Microsoft Corp. Microsoft Windows/386 environment. With LANTerm 2, the practical limit of applications that can run simultaneously is five, Wassmann said.

Built-in capacity

In addition to its LAN communications capabilities, LANTerm 3 and LANTerm 2 have built-in Digital Equipment Corp. VT-100 terminal emulation for communications with VAX hosts.

With a built-in dual-host capability, users can run concurrent applications from the LAN and a host. LANTerm 3 and LANTerm 2 have two serial ports, a parallel port and a coaxial connector for an Ethernet interface.

Wassmann said built-in diagnostic capabilities let users test and pinpoint problems with memory, video, I/O, the keyboard, and RS-232 and parallel ports.

"No one else in the industry provides such built-in diagnostics for their customers," Wassmann said. "I feel the equipment ought to be able to do that itself," rather than forcing users to rely on third-party software packages and incurring the costs associated with them.

Wassmann said the VT-100 emulation capability also sets LANTerm 3 and LANTerm 2 apart from other diskless LAN workstations.

LANTerm 3 comes in four models: Model CE, with color video graphics adapter (VGA) display and Ethernet interface; Model CA, with color VGA display and Arcnet interface; Model ME, with monochrome VGA display and Ethernet interface; and Model MA, with monochrome VGA display and Arcnet interface.

Models CE and CA cost $2,895; Models ME and MA cost $2,495. All four will be available in February.

LANterm 2 is available in the same four configurations as LANTerm 3 and is available now. Models CE and CA cost $2,395; Models ME and MA cost $1,995.

Esprit Systems can be reached by writing to 2115 Ringwood Ave., San Jose, Calif. 95131, or by calling (408) 954-9900.

Gateway gives host link

continued from page 23

tween the two environments. A VM user at a 3270 terminal, for example, could use a PROFS nickname, a CMS node name and a user identification name or create a personal nickname to communicate with an Inter-Network Courier user.

An Inter-Network Courier user, on the other hand, can create an alias with as many as 30 characters in place of a PROFS or CMS address. Once that alias has been added to the user's personal address book, the user need only select that nickname to transmit a message to a PROFS or CMS user.

Through support for IBM's Remote Spooling Communication Subsystem (RSCS) — a VM program that manages communications between nodes — the gateway appears to the user on the local network as a mainframe or VM node.

An import/export utility lets local net and VM users upload or download a list of message recipients; by doing so, users will not have to enter each name into their directories separately.

Another feature is an instant notification capability that informs users when a message has arrived, even if that message came from a remote mainframe via RSCS. Users in both environments receive verification when the message they sent has been received.

Future enhancements will allow Consumers' Modem Mail remote dial-in software to communicate with LAN users employing a Hayes Microcomputer Products, Inc.-compatible modem.

Support for PROFS documents in the gateway software is scheduled to be available by year end.

The mainframe must run IBM VM Release 4.0, RSCS Release 2.2 or later, and optionally, PROFS. The local net must be running DOS 3.1 or later.

The gateway software costs $5,000 and is available now.

Consumers Software can be reached by writing to 73 Water St., 7th Floor, Vancouver, B.C. V6B 1A1, or by calling (604) 688-4548.

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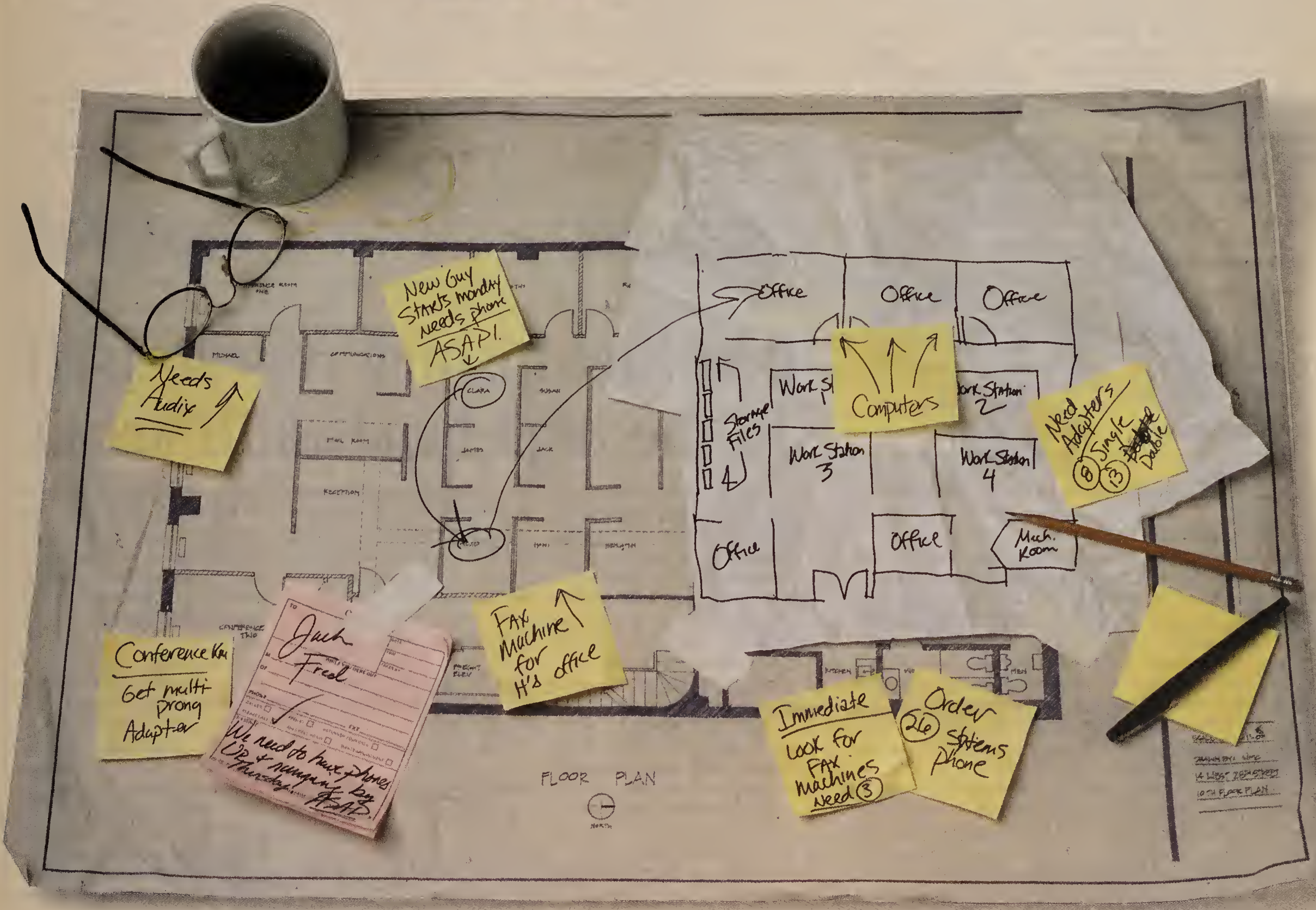

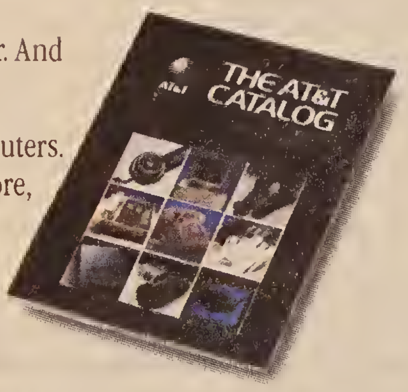

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USER DEMANDS

BY JAMES KOBIELUS

Debunking the myth of unlimited bandwidth

You just can't repeal the "no free lunch" law of economics. One of the false hopes of our times is the expectation of unlimited bandwidth from fiber optics and other technologies.

Transmission capacity is like any other resource: No matter how abundant it is, there are some very real costs of applying it to users' needs. Hard choices must be made while doling out capacity in proportion to actual requirements.

This problem grows ever more acute with the spread of local- and wide-area networking. Users are loading all types of traffic on their networks, demanding interoperability and transparency to remote resources, and expecting the responsiveness and throughput usually associated with dedicated, channel-access, host connections.

> Every new network technology brings its own special bandwidth allocation scheme.
>
> ▲▲▲

Personal computers are partly responsible for this state of affairs. They have transformed formerly complacent users into speed demons who expect instantaneous response from all on-line services, no matter how bandwidth-intensive.

As economists point out, scarcity is a ceiling on which we'll always hit our heads because demands have a nasty habit of rocketing skyward. *All* resources are scarce.

For example, water covers nearly 70% of the earth's surface, but that hasn't put a crimp in the markets for pumps, pipelines and Perrier. All these "value-added" cost items transform this most ubiquitous substance into a scarce commodity that must be parceled out judiciously.

Of course, telecommunications managers don't need to be schooled on the lesson that capacity costs. Transmission circuits are perhaps the major cost element in most networks, accounting for 25% to 75% of recurring costs. Laying excess bandwidth far in advance of requirements means the company is flirting with Chapter 11.

What managers will always need is a means for allocating bandwidth among competing users. If unlimited bandwidth is beyond our reach, "just-in-time" or "as needed" capacity will have to do.

Recent introduction of fractional T-1 services is very significant in this regard. Users previously had to take their digital bandwidth in 56K bit/sec digital data service or 1.544M bit/sec T-1 chunks, with scarcely any middle ground. Fractional bandwidth services allow for a more precise matching of capacity to volume over particular routes.

Every new network technology brings its own special bandwidth allocation scheme. Virtual networks, Integrated Services Digital Networks, Synchronous Optical Networks, Fiber Distributed Data Interface LANs and wideband packet-switching networks are the industry's next great hopes in this area. However, none of these technological advances come cheap, and all are — or all will be — employed primarily for internetworking.

Under these technologies, the effective bandwidth arriving at the average user's desktop is usually but a trickle of the great gulf streams flowing at the wide-area level. Still, this often amounts to considerably more than users have grown accustomed to. ISDN's 64K bit/sec is a mighty Mississippi of throughput compared with the standard 2,400 bit/sec dial-up modem connection.

It's great, but it's not unlimited bandwidth. That's a page from science fiction, not clear-eyed network management.

Kobielus consults on information technology in Alexandria, Va.

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The Newsweekly of User Networking Strategies

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Framingham, Mass. 01701-9172
(508) 820-2543
MCI Mail — 390-4868
An IDG Communications Publication

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EDITORIAL

Don't let history repeat itself in the high-bandwidth arena

Network bandwidth has always been a valuable commodity and a scarce resource (see "Debunking the myth of unlimited bandwidth," this page). The more bandwidth there is, the more applications that spring out of the woodwork to use it all up and demand still more.

Faster switches and ever-greater processing power in desktop workstations are driving up bandwidth demands. In addition, users are beginning to link applications that use extremely large files — computer-aided design and manufacturing systems, digital image processors, video editing systems and multimedia applications — across networks.

Ultimately, cooperative processing applications that make use of remote procedure call technology will support what amounts to networked parallel processing, which will add a large amount of additional traffic to already burdened networks.

In local-area networks, it's already apparent that Ethernet, the 16M bit/sec token ring and even Fiber Distributed Data Interface (FDDI) are too little too late for users that want to link the types of applications noted previously. These are the same users that are finding the Integrated Services Digital Network Primary Rate Interface, T-1 and even T-3 to be too little too late for their wide-area networks (WAN).

Currently, users have their hopes pinned on emerging high-bandwidth standards. They need one or two standards that apply to all of their networks, whether local, metropolitan or wide area.

But there are several standards under development already — FDDI II, Synchronous Optical Network, broadband ISDN and the 800M bit/sec high-speed channel — and there will no doubt be others.

> Users are likely to get a welter of competing standards, each of which will exist in multiple, not-quite-compatible variants.
>
> ▲▲▲

Unfortunately, what users are likely to get is a welter of competing standards, each of which will exist in multiple, not-quite-compatible variants.

Not so, you say? Just look back to the days when users with large X.25-based packet-switching networks had to maintain as many as 20 to 30 versions of X.25 code to cover all the different so-called standard X.25 implementations that vendors showered upon the market.

Users must get involved *now* in helping to define standards for high-bandwidth networking. Otherwise, they'll end up watching the same old rerun of multiple, incompatible standard products and services, this time in the high-bandwidth networking arena.

Considering the pace at which most standards committees move, involvement in them may not seem urgent, but it is.

Users should lobby their upper management to support their participation in the standards process. For those who hope to have an influence on the evolution of standards for high-bandwidth networking, now is the time to make your desires known.

Develop a corporate position on high-bandwidth transmission standards for LANs and WANs, and let the appropriate standards committees and vendors know about it.

And let vendors know, in no uncertain terms, that you won't put up with noncompliant implementations of standards.

The standards process is not a spectator sport.

In the words of Michael Ford, president of British Telecommunications, Inc. in New York, "You can't just be the one who waits until the end and says yes or no."

If you don't involve yourself with high-bandwidth transmission standards now, you'll have no one but yourself to blame if those standards don't turn out to your liking.

OPINIONS

Should CNI be optional for residential subscribers?

PRO:

By JACK WATSON

One of the best "Teletoons" to run in *Network World* depicted the devil saying to the inventor of telemarketing, "We have been waiting for you." That cartoon is posted on the walls of many offices that I visit, indicating that many other people feel the same way I do: With the number of unsolicited and unwanted calls to both my workshop/office and my home rising to ridiculous levels, I am looking for any way possible to put a stop to them, short of regularly changing numbers or doing without phone service.

Making calling number identification (CNI) available to any person or company I call for information or with which I might possibly do some business will only add to the number of people who have my number in their telemarketing target lists. When I go into a store, the proprietor does not receive my name, address and phone number unless I choose to reveal them. When I subscribe to a publication or order products by mail, I can specifically request that my name not be included in a subscriber list that is offered for sale. And I can request, and pay extra for, an unlisted phone number to cut down on calls from fund-raisers for questionable charities and from precious metals salespeople who like to call during the dinner hour.

CNI offers almost no benefits to the calling party. The benfits go to the party being called and, particularly, to businesses that can turn your onetime call into months or years of added misery. But rather than just rail against all use of CNI, here is a proposal that will preserve most business benefits of CNI as well as residential phone users' privacy.

CNI works only with newer, "smart" digital switches. Since the telephone operating companies know the difference between business lines and residental lines, for which they already charge differently for the same services, why not use this information as the starting point for controlling the use of CNI? The added cost, which would be mainly for new software for the switches, would be minimal.

The calling number of all business lines would be available to any called party — business or resi-

(continued on page 58)

Jack Watson is the pseudonym of a well-known consultant whose clients include both large businesses using calling number identification and telephone operating companies.

CON:

By DANIEL BRIERE

With privacy as their chief concern, users are threatening the implementation of calling number identification (CNI) in proceedings around the nation. Many users are afraid of being flooded with unwanted calls or having their phone numbers sold to everyone in sight. They don't think anyone has a right to their number unless they choose to give it to them.

I can respect privacy but within limits. As hard as I've tried to be sympathetic to anti-CNI concerns, I can only see them as an attempt by a small minority to hold back an advance that has clear benefits to the vast majority of communications users in the U.S.

These privacy issues are not forward-looking and are naive given the big picture. Most of the arguments against CNI are ones of privilege, not necessity — people who, for professional or personal reasons, do not want their numbers disclosed. That is not a legitimate reason to ban CNI-based services altogether.

With CNI-based services, the benefits far outweigh the detriments. Consider these examples:

- A child who can't remember his name dials your home number saying his mother has stopped breathing. Since your number is not 911 or some other emergency number, what can you do? Hang up and call the police, who will take ages to trace the call? Tell the child to call 911 and wonder if he can or does? Or use the CNI display on your phone to find out the child's number.
- You are repeatedly harassed by a caller who says he watches you all the time and will attack you the next time he gets you alone. With CNI or call tracing, these criminals can be tracked down by analyzing calling patterns. But without CNI, even a half-brain will be able to mask his actions.

The big advantage of using CNI, rather than call tracing, is that CNI is automatic. A distraught person who has just been subjected to a harassing call merely has to write down a number and not worry about punching the correct buttons on the phone to initiate a call trace.

For those who think they own their phone number, I have four words, "public switched telephone network," with the emphasis on the "public." This

(continued on page 56)

Briere is president of TeleChoice, Inc., a Manchester, Conn.-based telecommunications consulting firm specializing in long-distance services and intelligent network applications.

TELETOONS

BY FRANK AND TROISE

You shoulda been here in the old days.... it used to take the network trouble-shooter weeks to find us!

LETTERS

Shifting the blame

In his letter, Alex Lynch cites some valid examples from an operating company perspective ("Key to cabling is planning,"*NW,* Nov. 13).

He shares a commonly held view with other operating company personnel that if something does not work out, it's always the user's fault for lack of input, planning or questions. Many phone companies are the first to deny any problems and always point the finger at the user or other vendor in troubleshooting network problems.

The local operating companies change their tune when a user decides to investigate alternative carriers and bypass technologies.

For example, when a Chicago financial institution wanted a diversified route to the central office from a downtown building, they were quoted an engineering cost of $250,000. When they decided to look elsewhere and found a second local carrier that would provide an alternate route as part of the service, the phone company changed its tune and said it would do the $250,000 route-diversity project for free.

So much for the well-worn argument that users do not want to pay higher rates for diversification; they don't have to when there is competition. We need more competition at the local level to get rid of that "take it or leave it" monopoly mentality.

James Carlini
President
Carlini & Associates, Inc.
Chicago

CNI for corporate gain

I must take serious issue with your editorial about calling number identification (CNI) ("Misplaced privacy concerns shouldn't hold back CNI," *NW,* Sept. 18). Concerns about privacy in this age are never misplaced. We

(continued on page 56)

Network World *welcomes letters from its readers.*

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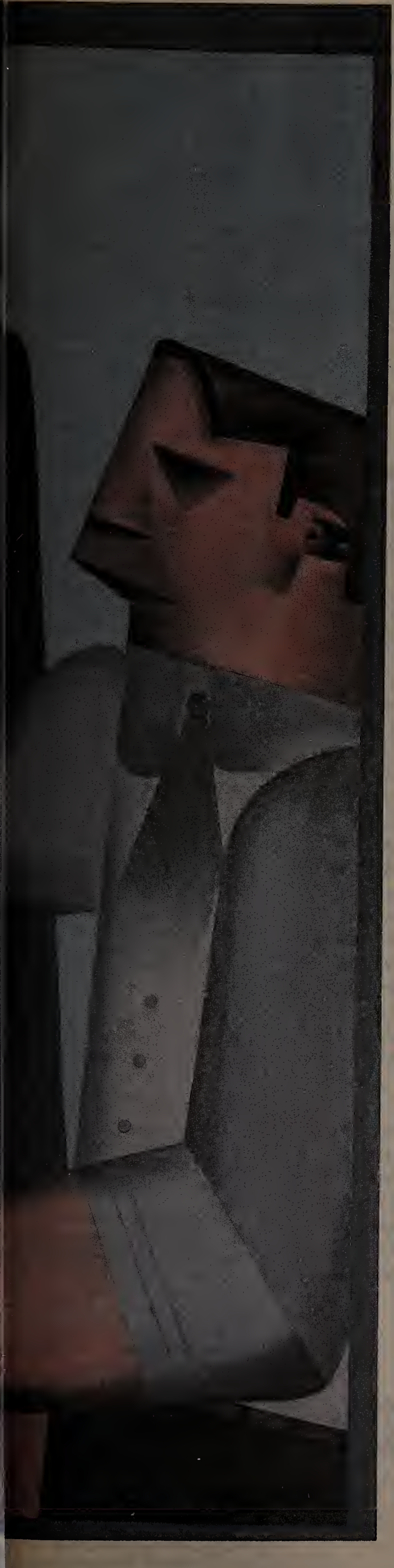

IN THEIR IMAGE

Effective user advocacy is the force for redefining today's telecom industry.

The time is right for users to reshape the telecommunications world. The 1980s have seen the collapse of the established, monolithic structure of the international telecommunications industry. The demise of the industry structure, both in the U.S. and in other countries — such as the U.K. and, to some extent, Japan and France — has been extensively chronicled.

In essence, large telecommunications service providers with close ties — even ownership ties — to their governments have left niches for aggressive, smaller service providers. These niches have been widening as more competition and revenue to be taxed drives a wedge between these monopolistic telecommunications companies and their protecting governments.

(continued on page 30)

Ahern is a partner specializing in telecommunications law with the law firm of Nixon, Hargrave, Devans and Doyle in Washington, D.C.

By VERONICA AHERN

ILLUSTRATION ©1989 MICHAEL MCLAUGHLIN

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Typically, such competitors are limited to the provision of services that are not basic — that is, not voice telephony service. But however limited, this process of change, called liberalization, has begun to infect most developed countries.

Why? What has caused the spread of the concept of liberalization? Like most political and structural matters, many factors play a part. The three most often cited are:

- Advances in technology, which make access to telecommunications services and facilities more widely available.
- Power and influence of the affected governments in proselytizing on behalf of industrial liberalizations.
- User requirements.

The conventional wisdom among students and scholars of international telecommunications is that the last of these items, user requirements, is the dominant factor.

But why does growth of demand result in such dramatic structural changes in an industry that, for reasons of self-preservation, should be perfectly willing to meet any user requirement? It's not just a matter of needing more facilities.

Users demand not merely more facilities, but cost-efficient facilities over which they can exercise control and about which they have some degree of choice.

These user demands have been the driving force behind the collapse of the old, monolithic structure of the international telecommunications industry. This is the catalyst for liberalization.

Obviously, having identified this force, the irresistible inclination is to harness it. How does a single user company with multinational telecommunications requirements affect the meeting of those requirements by a variety of foreign service providers? How does a user become an advocate?

Join the club

There are a number of groups and associations that may be helpful to users because of the skills, expertise and organization they bring to the cause.

Large U.S. users are likely to be familiar with the International Communications Association. Users with European interests may also be aware of the International Telecommunication Union (ITU), which provides user representation before worldwide standards and regulatory bodies, as well as information on technological and standards development.

Individual user companies have to investigate whether joining user associations may be helpful. However, joining an association is no substitute for really joining "The Club" — the insiders' old-boy network of telecommunications movers and shakers.

It's no longer entirely true that international telecommunications is controlled — or worse, understood — by a few select gentlemen who don't like strangers. But it's not entirely untrue either, as evidenced by a recently published report, commissioned by and addressed to the ITU.

The ITU's Report of the Advisory Group on Telecommunication, "The Changing Telecommunications Environment," contained some potentially amusing conclusions and recommendations on the role of users. The report is schizophrenic when it comes to the question of whether users should be allowed entry into The Club.

On the one hand, the report acknowledges that "the ability of users to specify their needs for advanced services with any precision is severely limited. This uncertainty creates a problem in attempting to apply the types of planning devices traditionally used by telecommunications administrations to forecast demands."

Yet, the Advisory Group does not specifically recommend greater user involvement in the activities of the ITU itself. Perhaps as a reflection of the nature of the organization, the Advisory Group instead recommends that national governments take on this task.

"Telecommunications has now become pervasive in the economic activities of all nations. There are now a variety of operators and users, as well as governmental and developmental agencies, that have a direct interest in the work of the ITU. Therefore, national governments should ensure that their representation at the ITU reflects adequately the

(continued on page 56)

Hughes' New Ku-Band Fleet Has Businesses Everywhere Looking Up

Hughes Communications is expanding into Ku-band satellite services, and that's good news for your business.

Hughes' acquisition* of IBM's Satellite Transponder Leasing Corporation gives us a powerful and immediate Ku-band presence to complement our existing C-band services. With two Ku-band satellites operational, and one more to be launched next June, we can now meet any satellite communication requirement you have.

Our new Ku-band service has applications for network-quality broadcasting and business video, VSAT networks and SCPC services, and newsgathering and backhaul transmissions. This entry into Ku-band services shows once again that Hughes responds to our customers' business and technical requirements with unmatched imagination. And Hughes will launch more Ku-band birds in the future, insuring unparalleled flexibility, as well as back-up and in-orbit protection.

With our growing capabilities in both C-band and Ku-band, Hughes is the company of choice for satellite services. So if you're searching for that special combination of reliable technology and innovative solutions to your communications needs, call us at 1-800-232-8728. Your business will start looking up.

* Pending FCC approval. © 1989 Hughes Communications

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To work for the best, plan for the worst

CONTINUED FROM PAGE 1

office service. It is in the local telephone companies' interest to assuage fears regarding disasters in the local loop; if they don't, users may choose to bypass them and connect directly with long-distance carriers.

There are five basic levels to consider for the purposes of recovery evaluation and planning when insulating a private branch exchange from outside disasters. These are discussed in detail in the accompanying article "Levels of disaster and recovery" and illustrations on page 34.

Disaster planning elements

There is more to the process than just technical recovery, however. An integrated disaster plan that covers all aspects of communications, including order entry, product dispatching and general corporate communications, must be put in place. Nearly all departments within the average organization use telecommunications to some degree. Thus, a viable plan must consider these various needs to meet a crisis situation effectively (see "A case study in disaster recovery," page 52).

Briere is president of TeleChoice, Inc., a Manchester, Conn.-based consulting firm specializing in long-distance competitive analysis and network design. Walton is president of Walton & Walton Associates/Communications Consultants of Richmond, Va., a telecommunications consulting firm specializing in disaster recovery and network design.

Your company's best defense against fires, cable cuts and acts of God is to implement a good disaster recovery plan — today.

The following is a general step-by-step guide to establishing a contingency plan for your telephone system.

It takes into account many of the technical concepts, as well as the human side of recovery planning: training people and rehearsing the plan as it was designed.

■ **Step 1: Set up a disaster team.** This should consist of major department personnel and building and maintenance people. An important point: Pick people who will be available for planning. Managers who travel a great deal are not good choices.

Pick people with company depth as well. A manager who has worked in four or five departments may have more to contribute than one who has worked in only one department. Attitudes are very important in selecting team members. Choose people who realize the importance of a disaster plan.

■ **Step 2: Determine the types of disasters for which you are planning.** Concentrate specifically on what is most likely to happen within your particular geographical area and to your particular system.

For example, to companies located in the Midwest, tornadoes and floods typically present more of a concern than earthquakes. If your firm doesn't rely much on long-distance traffic, then you might not want to plan explicitly for long-distance carrier outages, but rather on failure of local telephone company equipment.

Take into account how the local telephone company has dealt with similar disasters in the past. Ask them what their line-loading policies are for certain disasters.

For instance, during the San Francisco Bay Area earthquake in October, local and long-distance carriers blocked calls into the disaster area to keep lines open for residents to call out. A disaster plan that maintains inbound 800 lines in this area would be worthless if the long-distance carrier is blocking the calls.

Instead, inbound calls should be rerouted to offices that would not be affected by an earthquake.

■ **Step 3: Identify key locations and functions to be restored.** Determine which lines are critical to your firm — where the telecommunications hot spots are within your company.

Any company has essential areas: customer service, order entry, key decision-making centers. A contingency plan has to rank the importance of communications to these areas — revenue-generating or not.

Often, this task can be a political as well as practical chore. It may be necessary to balance potentially unrealistic expectations of planners and decision makers with the economics of reality.

One of our clients requested a plan for total restoral capability in the event of an emergency. The result was a backup facility plan using four T-1 lines.

When the client learned how much this plan would cost, it began to focus on what was really important. Eight plans later, the company was down to a dial-up plan with 9.6K bit/sec circuits, a much more economical and realistic scheme.

■ **Step 4: Determine time tol-**

(continued on page 34)

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How we helped improve the performance of the new BMW.

There's a sleek new shape on the landscape. A gleaming testament to the fine art of engineering. It's the new North American headquarters of BMW. **ROLM** But like all things BMW, the real power lies under the hood. At the heart of the communications system—the 9751 CBX from ROLM. Why *ROLM,* of all the systems they could have chosen? It began with a set of expectations. A voice message system that was simple to use. **ROLM** An installation that wasn't a nightmare. Service and support they could count on. All the things they assumed they could get anywhere. But which, surprisingly, only one company had: ROLM. The installation went so smoothly that BMW's normal, efficient operations never hit a bump. **ROLM** On the first day in the new building, every phone had dial tone, every computer display was aglow. Before long, PhoneMail had become an everyday part of doing business, from the board room to the mail room. But even with all this, a feature that wasn't even on their list of expectations turned out to be the clinching factor: ROLM's association with IBM. This combined expertise in voice and data offered benefits no one else could match. **ROLM** Voice/data integration, up-to-the-minute solutions and a solid link for the long term. A long term that includes the technology of Siemens, a world leader in ISDN. These days, there's a new standard of performance at BMW. You'll find it parked on every desk: ROLM. **ROLM**

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Levels of disaster and recovery

There are five levels of recovery evaluation and planning when insulating a private branch exchange from outside disasters (see Figure 1, this page). These recovery levels are:

- Level 1 — a feeder cable outage from your nearest demarcation point.
- Level 2 — an outage of the serving central office in the area.
- Level 3 — an outage of one of the intermediate local access and transport area switching offices on the path to the carrier point of presence (POP).
- Level 4 — an outage of the central office serving the carrier's POP.
- Level 5 — an outage of the carrier POP.

The levels of outage that occur the most frequently are Levels 1 and 2. Either of these two conditions deprive your PBX and data center of network connectivity and central office dial tone. Without outside dial tone, you cannot dial an operator or an equal access number to get to a long-distance carrier, and they cannot dial you. You are effectively shut down.

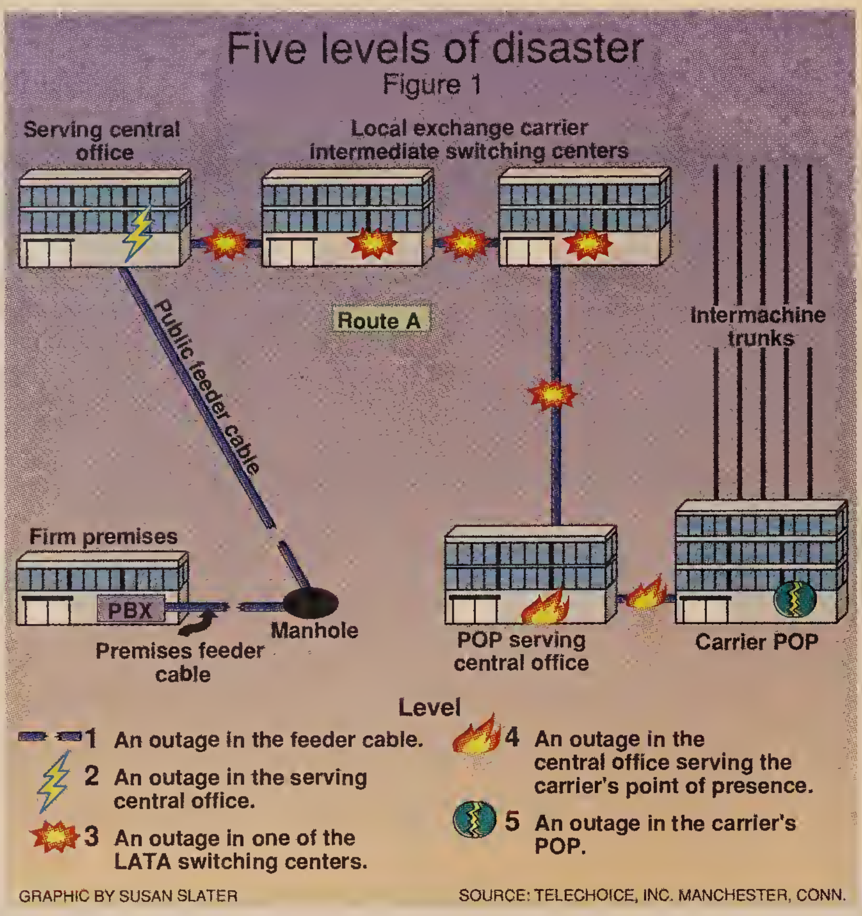

Five levels of disaster

Figure 1

Serving central office
Local exchange carrier intermediate switching centers
Route A
Public feeder cable
Intermachine trunks
Firm premises
PBX
Manhole
Premises feeder cable
POP serving central office
Carrier POP
Level
1 An outage in the feeder cable.
2 An outage in the serving central office.
3 An outage in one of the LATA switching centers.
4 An outage in the central office serving the carrier's point of presence.
5 An outage in the carrier's POP.

GRAPHIC BY SUSAN SLATER

SOURCE: TELECHOICE, INC. MANCHESTER, CONN.

Disaster recovery Levels 3, 4 and 5 are of varying significance, depending on the sophistication of your area's local and long-distance carrier networks. Some metropolitan areas have redundant paths for breaks between your serving central office and the carrier POP. But many local areas don't, and if there is an emergency in the carrier POP and your carrier isn't AT&T, chances are there isn't another access point within your LATA.

Levels 1 and 2

A primary topic of conversation with the local telephone company should be creating a second cable route from the serving central office to your company's location. Plans can range from routing lines over another set of telephone poles to digging new service trenches for cables.

A second key point to discuss is arranging for a second central office to provide an alternate segment of your local dial-tone service — both direct-inward dial and direct-outward dial (DOD) lines.

There are several ways to accomplish this. The objective is to split DOD trunk lines so that some of the circuits go to one central office and the rest go to another central office. The intelligence within the PBX will sort out the routing.

Establishing such multiple central office routing as part of daily operations is a very important part of disaster recovery planning. If you use the routes daily, then you know it works; that element of the recovery plan becomes a known entity, and your staff becomes familiar with it.

Remember that outgoing DOD trunks are capable of two-way traffic, even though they are typically used just for outgoing calls. During an emergency, the incoming path can easily be activated for inbound calls.

Using DOD in this manner requires practice and preparation on the user's part. Unfortunately, it is one aspect of disaster recovery that cannot be integrated into day-to-day operations; it must be tested separately.

The testing is fairly straightforward. Most central offices do not require any changes to reverse the direction of a DOD circuit. The user's PBX does require some software changes, however. To test, make the appropriate changes and establish a pseudo trunk group of converted DOD lines. Then dial each one and make sure calls can be completed into your system.

Rerouting for recovery

The combination of the above two plans provides for recovery of dial tone, thwarting the first two levels of disaster outlined in Figure 1. This procedure will at least get the company back in touch with the world and vice versa.

The other three levels deal with network recovery. These may be addressed through several means, again depending on the degree of preparedness to be built into the system.

Figure 2 on this page shows a possible alternative routing scheme. Dial-tone recovery is accomplished through an alternate path to a foreign central office. From that point on, the local telephone company provides a second route to the carrier POP to avoid any Level 3 disasters. Level 4 and 5 disasters are covered by the arrangement of a T-1 connection to another carrier's serving central office and POP.

This design uses digital cross-connect service (DCS) from the local telephone companies. DCS allows the user to configure lines remotely in the event of an emergency. A customer-controlled reconfiguration terminal or personal computer can be collocated with the PBX to reroute traffic.

Every user company should develop business relationships with at least two carriers to increase network recoverability. Typically, the split of traffic between the two carriers is 80%/20% or 90%/10%. The user, therefore, retains two methods of communications for quick rerouting in emergencies.

While the use of two carriers may cause the loss of some economic efficiencies and create some billing or network management difficulties, these are somewhat offset by gains in peace of mind, network flexibility and increased bargaining power with each carrier. On the whole, you are better off with two carriers.

In our example, 24 circuits come from Carrier A's POP into the DCS. Twelve of these circuits are sent through the T-1 line to the central office serving Carrier B's POP, to be sent over Route B. The same is true for the DCS in Carrier B's serving central office. The user is covered for a disaster in either POP and in either serving central office.

Thus, any of the following could occur:

- Part or all of the traffic could be sent over Route B if a Level 3 outage occurs.
- Part or all of the traffic could be routed through the central office serving Carrier B's POP if a Level 4 disaster hits the primary serving office.
- Part or all of the traffic could be routed to Carrier B's POP if a Level 5 outage occurs in Carrier A's POP.

We say part or all of the traffic because you may not be able to carry all of your traffic in an emergency, depending on the total number of channels on Routes A and B. But at least you'll have half of your traffic operating normally at all times.

— Daniel Briere and L. Thomas Walton

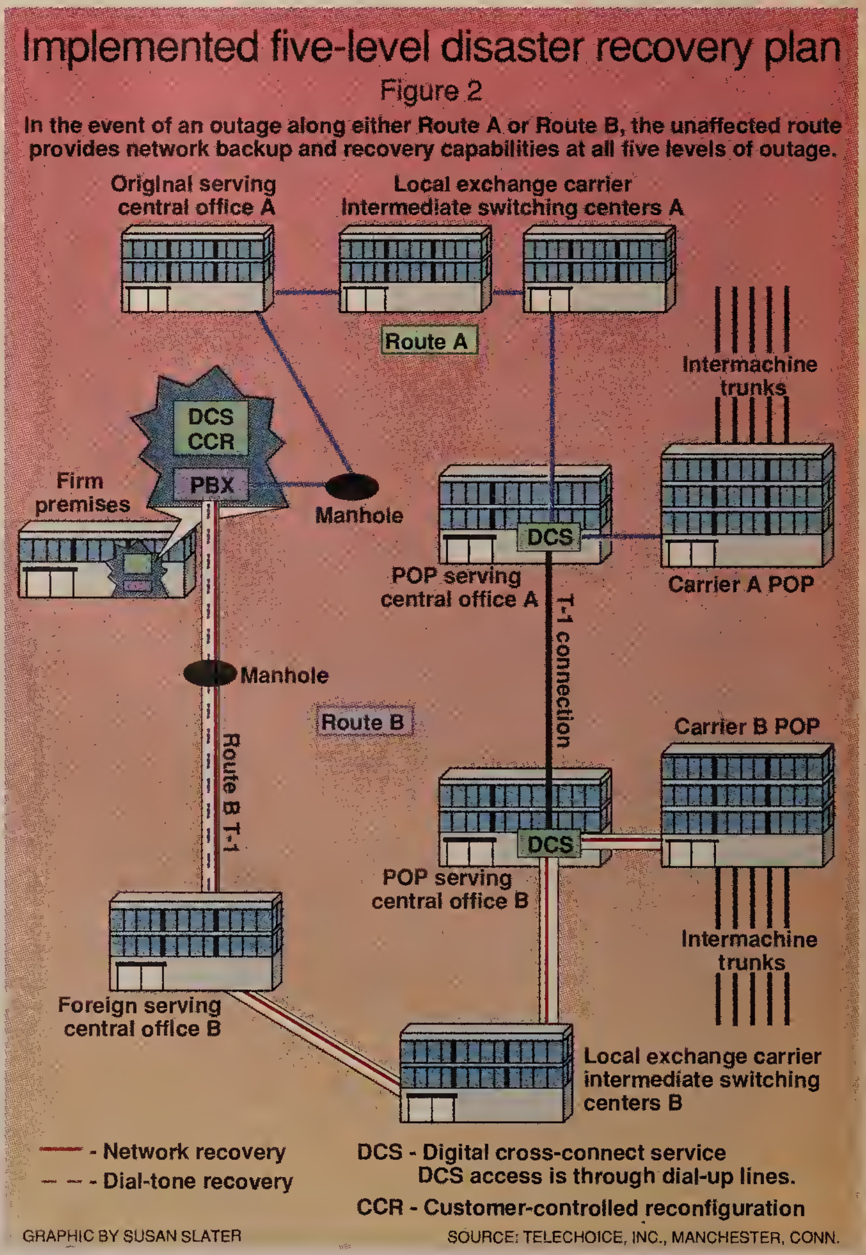

Implemented five-level disaster recovery plan

Figure 2

In the event of an outage along either Route A or Route B, the unaffected route provides network backup and recovery capabilities at all five levels of outage.

Original serving central office A
Local exchange carrier intermediate switching centers A
Route A
Intermachine trunks
DCS
CCR
PBX
Firm premises
Manhole
POP serving central office A
Carrier A POP
T-1 connection
Manhole
Route B
Route B T-1
Carrier B POP
POP serving central office B
Intermachine trunks
Foreign serving central office B
Local exchange carrier intermediate switching centers B
- Network recovery
- Dial-tone recovery

DCS - Digital cross-connect service
DCS access is through dial-up lines.
CCR - Customer-controlled reconfiguration

GRAPHIC BY SUSAN SLATER

SOURCE: TELECHOICE, INC., MANCHESTER, CONN.

(continued from page 31)

erance to outages. How long can your company operate with limited or no communications? More than likely, some functions will be more tolerant to outages than others. Some emergencies will only affect portions of the company.

Also consider the image of your firm, especially to potential customers. While your company may be able to function without telephone service for weeks, this could have a detrimental effect on its image as people try to call and can't get through. While intangible, a lost image can be as important as lost sales.

- **Step 5: Perform an equipment needs evaluation.** Check out the physical layout and the electronics involved with these different areas. Your contingency plan must deal not only with reestablishing communications but also — in the case of a physical disaster such as a fire or explosion — with moving personnel and equipment. Neither has to be a major undertaking.

Establish plans for each of the functions affected, but be sure they all integrate well into an overall disaster plan.

- **Step 6: Route around line outages.** Develop a plan that considers problems with your local or long-distance carrier.

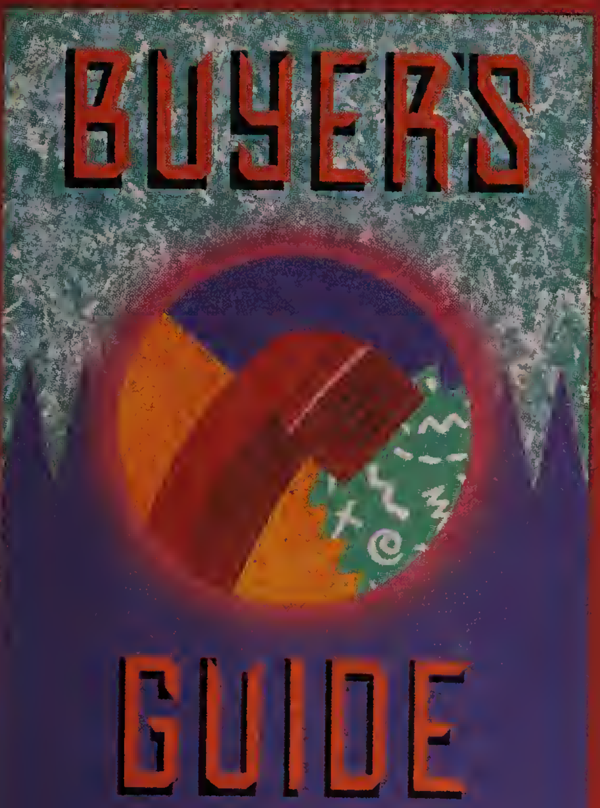
This is where the five levels of recovery planning come into play. Look at rerouting local and long-distance circuits through different central offices. Your local telephone company representative can help determine the costs to diversify routing of your circuits.

In some cases, diverse routing can be installed at minimal cost to the customer, depending on available cabling and the geographical location of the customer premises within the wire center.

Customers whose facilities are located near wire center boundaries often have no problem securing routing through more than one central office; however, users near the middle of a wire center may face some construction fees to get diversity. One way these costs can be reduced is by teaming with other companies in your building and developing a shared backup system.

Also look at alternate forms of communications within your

(continued on page 52)



VSAT SYSTEMS

A VSAT in your future

By PHILIP ARST

VSAT network services have become widely available over the past few years and are bringing the benefits of private satellite nets to both large and small network operations.

In the past, very small aperture terminal networks were procured primarily by large companies with specialized data communications staffs. In many instances, these companies had to be prepared to own and operate their own hub, or master station. The economics of this approach and the newness of the technology limited VSAT growth.

However, major changes have taken place in the VSAT industry over the past few years. No longer the province of a few major manufacturers and carriers serving a few large customers, it now comprises a dozen VSAT service providers offering a variety of national and regional services.

Own your own VAN

Using a VSAT net is like owning a private packet-switching network that runs over your own dedicated long-distance and local channel facilities. No longer will you need to deal with a multitude of telephone companies, and no longer will you need to develop a complete, "start from scratch" network design.

The VSAT services industry has established a large number of hubs which the service providers own and operate for multiple customers. This practice, known as shared hub operation, benefits all sizes of network users, saving them the expense of owning and operating a large and costly hub to serve only their own needs. The extent of this hub proliferation is shown in the figure on page 48.

With VSAT network service widely available from a variety of manufacturers, carriers and service providers (see chart beginning on page 37), what should you look for when choosing one?

Your network size and need for customized services and reports should drive your initial choice. If you have more than 100 locations, then just about every vendor in the industry will be interested in providing services for you. However, if you have fewer locations, some of the large carriers will implement your system themselves, while others will refer you to a small service provider.

Additionally, if you have more than sev-

(continued on page 47)

CHART • GUIDE

A *Network World* Buyer's Guide chart listing the features of a variety of VSAT services begins on page 37.

Arst is president of Communication Strategies Associates, Inc., a Cupertino, Calif.-based consulting firm specializing in very small aperture terminal and hybrid terrestrial networks.

> No longer just for large users, VSATs offer a range of national and regional services to operations of all sizes.

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VSAT service providers (continued on page 48)

Company	Service	Shared hub locations	Disaster recovery backup hub locations	Private hub conversion option	Voice capability	Video uplink service	Remote net management console	Supplier of VSAT hardware	Satellite support furnished via	Alaska and Hawaii coverage	Satellite frequency band	Outbound/inbound satellite data rates (bit/sec)	Data protocols supported	Special services
AvData Systems, Inc. **Atlanta** **(404) 523-2848**	AvData	Atlanta, Birmingham, Ala.	Atlanta, Birmingham	Yes	Special order	Planned	Monitor, control	NEC	Leased transponder	SCPC, Transponder footprint	Ku	56K/56K	SDLC, BSC 3270, asynchronous, X.25, Burroughs Poll/Select	Full end-to-end data communications network solutions; net design, implementation and operation
Computer Power, Inc. **Jacksonville, Fla.** **(904) 350-0270**	CPI Datanet	Jacksonville	Carlstadt, N.J. (Comdisco, Inc.)	Yes	Conversational; conference	None	Monitor	HNS	Leased transponder	Transponder footprint	Ku	512K/128K	SDLC, BSC, HASP, Physical Unit 4/Physical Unit 4, asynchronous, X.25	Data, voice and video; complete net management included; satellite and terrestrial support of front-end processor
Contel ASC **Rockville, Md.** **(301) 251-8453**	Data Messenger Network	Mountain View, Calif.	Spring Creek, N.Y.	Yes	Special order	No	Monitor	Contel ASC	Owned satellite	SCPC, Transponder footprint	C	153.6K/1,200 and 9.6K	SDLC, X.25, X.25 with asynchronous PAD, Burroughs Poll/Select, SCADA, Programmed Airlines Reservation System, BSC 3270, BSC 3780	Site licensing; in-house field service; net design and optimization
	Data Messenger 3000	New York, Mountain View, Charlotte, N.C., Washington, D.C.	Planned	Yes	Special order	Yes	Monitor	Contel ASC	Owned multiple satellites	SCPC	Ku	56K/256K, 56K/64K	SDLC, X.25, BSC, asynchronous	In-house installation and maintenance; PC-based enhancements; 24-hour monitoring
Cylix Communications Corp. **Memphis, Tenn.** **(901) 761-1177**	Cylix	Memphis	None	Yes	No	Special order	Monitor, control	Comstream	Leased transponder	Transponder footprint	Ku	56K/56K	SNA SDLC	Mini-hub on customer premises with support by Cylix; full diagnostics
GTE Spacenet Corp. **McLean, Va.** **(703) 848-1370**	Skystar	Chicago, New York, Houston, Los Angeles, Minneapolis	All other shared hubs	Yes	Special order	Yes	Control, monitor	NEC	Owned multiple satellites	Transponder footprint	Ku	56K/56K	X27, X37880 BSC, asynchronous, SNA SDLC, BSC 3270, BSC 2780/3780, CCITT 1984 X.25, Burroughs Poll/Select	Combined data/video; retail/banking specialities
Hughes Network Systems **Germantown, Md.** **(301) 428-5500**	ISBN	New York, Los Angeles, Minneapolis, Carlstadt, N.J. (planned)	Germantown	Yes	Conversational	Yes	Control, monitor	HNS	Owned multiple satellites	SCPC; Transponder footprint	Ku	512K/128K	SDLC, HASP, BSC 3270, Tinet, X.25, asynchronous X.3 PAD, bit transparent	Operation/monitoring of dedicated hubs on customer premises; combined data, voice, video networks
Nova-Net Communications, Inc. **Englewood, Colo.** **(303) 799-0990**	Ku Band	Dallas/Fort Worth; Atlanta; Denver; Tulsa, Okla.	All other shared hubs	Yes	Special order	Yes	Control, monitor	NEC	Special order	SCPC; Transponder footprint	Ku	56K/56K	Asynchronous, BSC, SNA/SDLC, X.25, HDLC	24-hour monitoring; SCADA; multiple VSAT integration; mini-hubs
	C-Band	Mountain View, Calif.	Mountain View	No	No	No	Monitor	Contel ASC	Special order	SCPC; Transponder footprint	C	19.2K/1,200 and 9.6K	SDLC, asynchronous	SCADA; integration of multiple VSAT services; 24-hour monitoring of service
	LSAT	Washington, D.C.; Montrose, Colo. (planned)	None	No	No	No	Monitor	HNS	Leased service	None	L	1,200/15.625K	Asynchronous	Remote monitor; hybrid nets with data via Ku-, C-band, terrestrial
Pittsburgh Int'l Teleport **Pittsburgh** **(800) 634-6530**	Flex-Net	Pittsburgh	Planned	Yes	Conversational; other	Yes	Monitor (planned)	HNS	Leased transponder	SCPC	Ku	512K/128K	All HNS supported protocols	Video turnkey; full net management; full service satellite networks
Racal-Milgo SkyNetworks **Charlotte, N.C.** **(704) 377-2232**	SkyNet-works	Charlotte, Duncan, S.C., Omaha, Neb., Delaware, Ohio	Charlotte	Yes	Special order	Yes	Control, monitor	NEC	Leased transponder	SCPC; Transponder footprint	Ku	56K/56K	SDLC, BSC, asynchronous (X.3) X.25, Burroughs Poll/Select	On-demand T-1 with disaster recovery; interactive, batch data networks
Scientific-Atlanta, Inc. **Melbourne, Fla.** **(407) 255-3000**	Skylink 25	Melbourne, Atlanta, Los Angeles, Stamford, Conn. (planned)	Atlanta; Melbourne	Yes	Special order	Planned	Control, monitor	Scientific-Atlanta	Leased transponder	SCPC; Transponder footprint	Ku	56K/56K	SDLC, asynchronous, X.25, SCADA	24-hour net support, full disaster recovery; hybrid nets; enterprise nets; video support

Disaster recovery backup hub location = When a city is named, backup service is offered only from that location. The designator "All other shared hubs" means that backup services are available from all of the vendors' shared hub locations.
Voice capability = Conversational voice service is a product intended for WATS-type replacement. Conference service is a product that is suitable for group conferencing.
Video uplink service = All VSATs are capable of receiving video broadcast on the same satellite. Vendors that offer this service will uplink these broadcasts on their own equipment rather than via a separate facility.
Remote net management console = Permits customers to monitor their traffic via a remote display console or control their private network traffic operations.
Satellite capacity = Some vendors supply satellite capacity via owned transponders, whole satellites or multiple owned satellites. Others supply capacity that they have under long-term bulk lease or lease capacity on special order only.
Alaska and Hawaii coverage = SCPC service to Alaska and Hawaii requires separate satellite earth stations to provide a point-to-point link. Transponder footprint service can be received on VSAT remote earth stations and be integrated into the main VSAT service.
Satellite channel data rates = These channels provide multiple virtual circuits. Multiple inbound and outbound channels may be combined to provide any needed data capacity.
Special services = These are vendor statements as to their special capabilities.

HNS = Hughes Network Systems
NEC = Nippon Electric Co.
SCADA = Supervisory Control and Data Acquisition
SCPC = Single Channel Per Carrier
STM = Satellite Technology Management

This chart includes a representative selection of vendors in the VSAT services market. Most vendors offer other VSAT services, and many vendors not included offer a full range of competitive products.

SOURCE: COMMUNICATION STRATEGIES ASSOCIATES, INC., CUPERTINO, CALIF.

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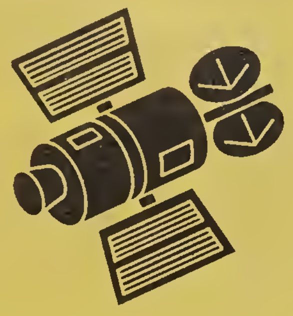

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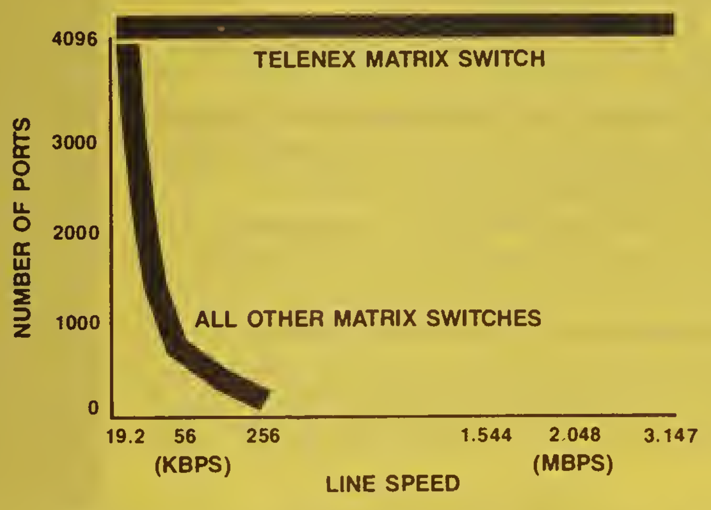

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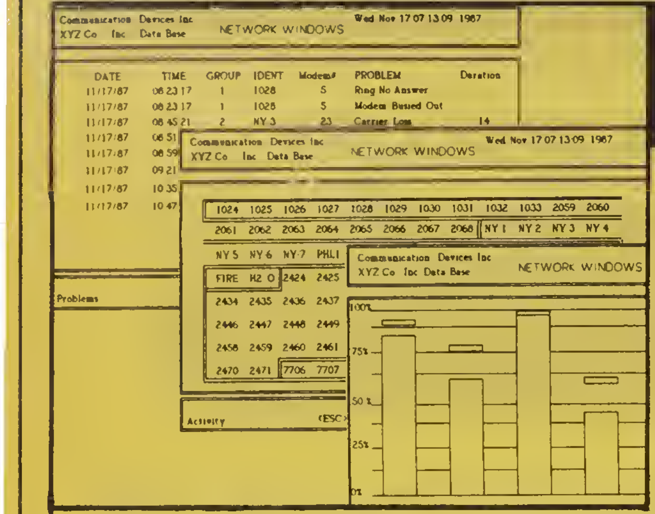

```
Communication Devices Inc                        Wed Nov 17 07 13 09 1987
XYZ Co   Inc   Data Base      NETWORK WINDOWS

DATE       TIME      GROUP  IDENT  Modem#  PROBLEM            Duration
11/17/87   08 23 17  1      1028   5       Ring No Answer
11/17/87   08 23 17  1      1028   5       Modem Busied Out
11/17/87   08 45 21  2      NY 3   23      Carrier Loss       14
11/17/87   08 51
11/17/87   08 59
11/17/87   09 21
11/17/87   10 35
11/17/87   10 47

Problems

Communication Devices Inc                        Wed Nov 17 07 13 09 1987
XYZ Co   Inc   Data Base      NETWORK WINDOWS

1024  1025  1026  1027  1028  1029  1030  1031  1032  1033  2059  2060
2061  2062  2063  2064  2065  2066  2067  2068 | NY 1  NY 2  NY 3  NY 4
NY 5  NY 6  NY 7  PHL1
FIRE  H2 O  2424  2425
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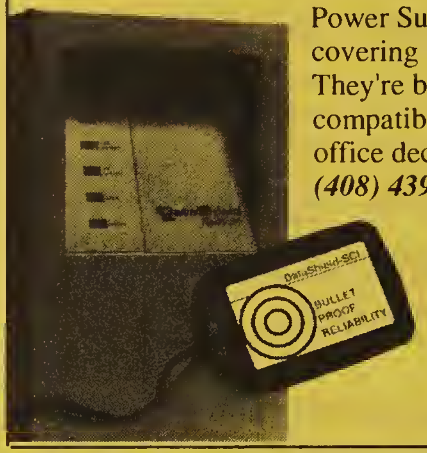

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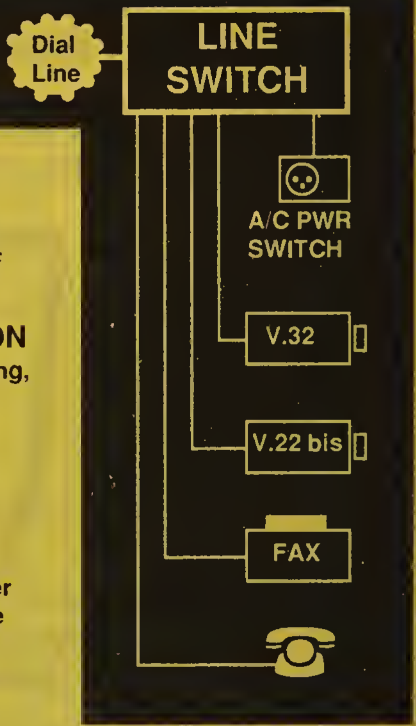

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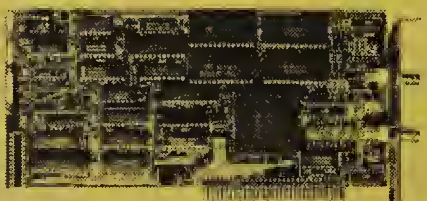

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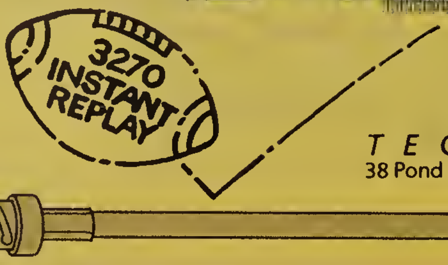

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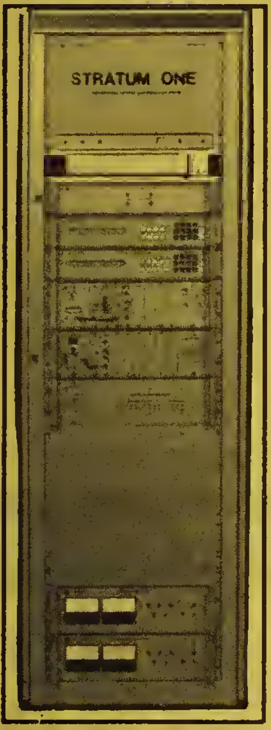

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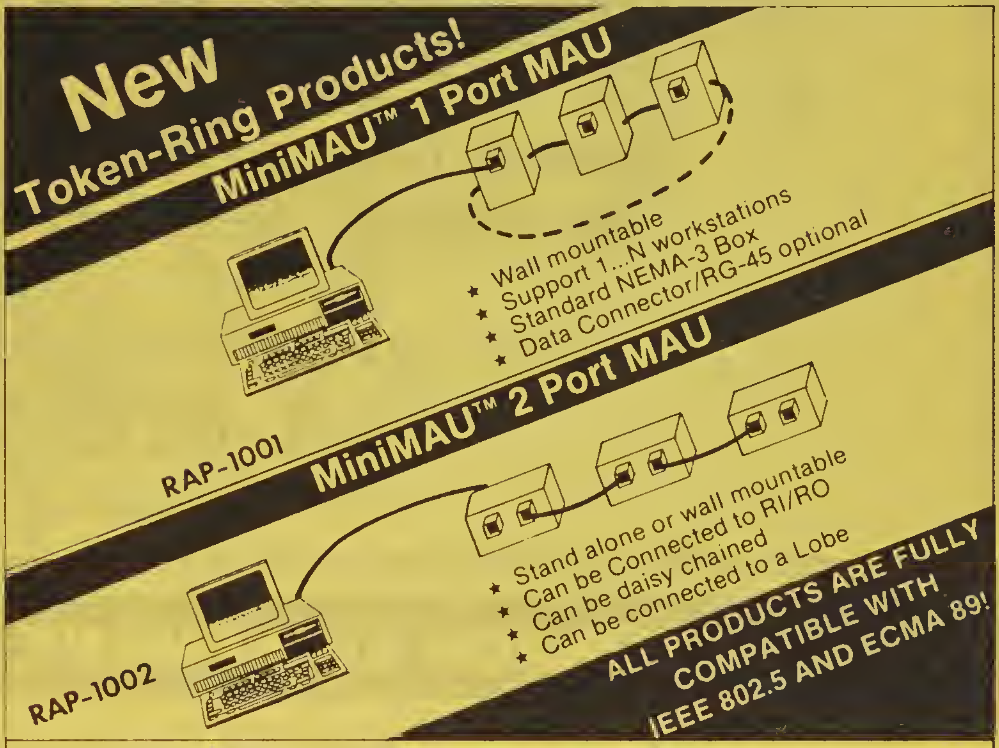

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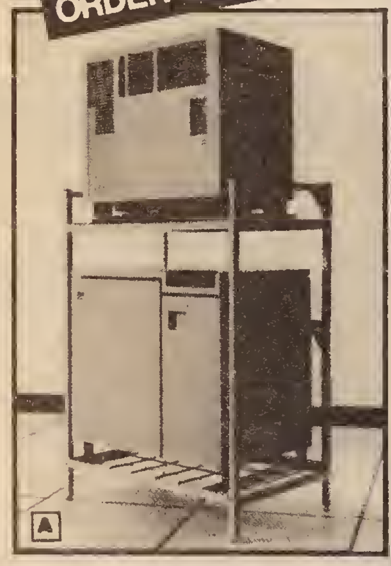

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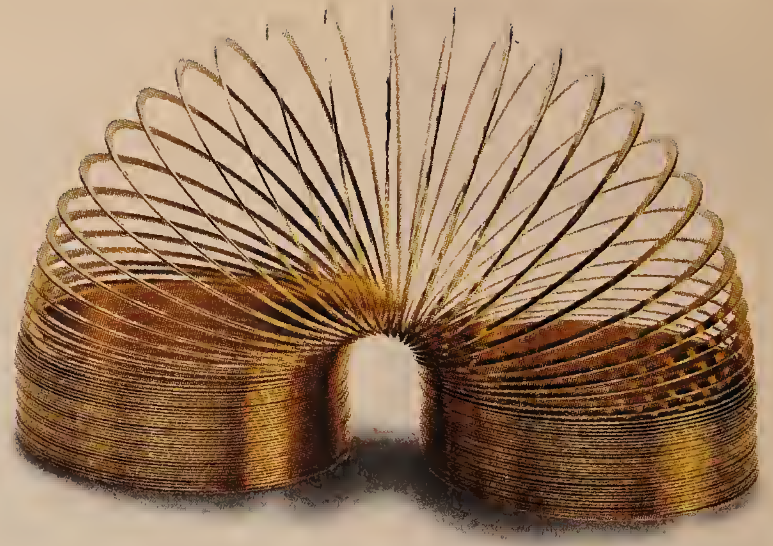

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See the FAXNeT Form on Page #59

(continued from page 35)

eral hundred locations, you may want to use the technical approach of the VSAT service providers while operating your own dedicated hub. Even in this situation, the availability of these services will be helpful because you will have the option of using a provider that is compatible with your dedicated hub as a backup or overload facility.

Since VSAT service providers get their equipment on an OEM basis from the major carriers, they claim that equipment differences are not a factor. Because they are set up to support smaller networks, they say they are in a better position to customize solutions, provide special reports and offer additional net management capabilities for their customers.

Geographic proximity to the service provider's hub may be a factor in obtaining full turnkey services. Additionally, host link costs may be reduced by geographic proximity, but that fact is only significant for very small networks and should not be a driving factor for most users.

On the other hand, large carriers and manufacturers have extensive software and integration capabilities. One of the major benefits of a VSAT net is its ability to support multiple applications, and the carrier's or provider's ability to implement your specific mix of services is important. Additionally, their operation of multiple satellites and multiple shared hubs will be a consideration when evaluating backup and growth capabilities.

Video and voice support

As video gains wider acceptance in industry, it has proven to be a particularly attractive option for VSATs. Video reception is virtually free when piggybacked on VSAT service. For as little as $400 per remote VSAT node, video reception capabilities can be added. Typical video uplink costs are from $800 to $1,500 per hour for transponder and uplink services. For about $5 per hour each, you can provide 300 remote locations with video training and product information.

Voice is generally not considered the prime driving application for VSAT network services. The quality of satellite voice is almost as good as terrestrial voice; however, satellite delays are an annoyance. Satellite voice can provide major cost reductions for service to remote areas. If voice networking costs are important for your company, look for a vendor that has integrated voice into its packet-handling capabilities and can show you actual voice-handling reference accounts.

Because VSAT service pricing varies by application, it has not been individually reported in the accompanying chart. Typical prices range from $400 to $750 per drop per month, depending on the size of the network, traffic levels, number of services integrated, years of operation and level of backup selected. Once network hardware is fully depreciated — typically after five years — annual costs can drop approximately 40% to 60%, providing very significant reductions for as long as the network is operated.

VSAT service costs can typically run 10% to 30% below comparable terrestrial implementations. However, not all data network operators look solely at cost reductions.

Allan Kalb, senior vice-president of systems at St. Louis-based A.G. Edwards & Sons, Inc., a major New York Stock Exchange brokerage firm, says, "We opted for a VSAT network because of the greater reliability, flexibility and growth capabilities it provides. We selected a network configuration utilizing a private hub with a shared hub backup. While this backup capability eliminated most of our potential cost savings over our current nonredundant terrestrial network, we chose this approach because we cannot afford to be down for even an hour."

Providing users with satisfactory response times is an issue with all network designs. Satellite propagation delay adds approximately 0.5 second to all round-trip transactions. However, one important aspect of satellite system selection that is not well-known is that data is transmitted over satellite networks at significantly higher data rates than those of terrestrial networks. This can offset some or all of the satellite propagation delay.

Both shared and private hub nets provide identical capabilities in this respect, and both types of networks may be tailored to provide improved levels of response times at different cost levels. For example, a reduction in network response time from 2.5 to 1.5 seconds can be obtained for an approximate 10% to 30% increase in network operating costs. These cost/response time trade-offs entail purchasing additional host link bandwidth or satellite capacity and support hardware. Changing software to support more efficient protocols and increasing the bandwidth of the connection between the remote VSAT and the data terminal equipment can also be very productive.

One of the most cost-effective methods of improving satellite network response time is to increase the bandwidth of the host link. That's easy for most large private networks, which typically have the hub processor and front-end processor in the same facility, but it's not as easy for smaller users to accomplish. However, with the availability of T-1 lines at attractive prices, bandwidth augmentation to a shared hub may not be very expensive and can provide a substantial improvement in response time.

For the smallest networks, this approach does not apply, and response time improvements, if needed, are best obtained via conversion from polled protocols to nonpolled protocols, such as X.25 between the host and the hub. Space segment bandwidth augmentation can also provide cost-effective results, depending on the application.

The superior reliability of VSAT networks is a common vendor claim, but can

(continued on page 48)

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VSAT service providers (continued from page 37)

Company	Service	Shared hub locations	Disaster recovery backup hub locations	Private hub conversion option	Voice capability	Video uplink service	Remote net management console	Supplier of VSAT hardware	Satellite support furnished via	Alaska and Hawaii coverage	Satellite frequency band	Outbound/ Inbound satellite data rates (bit/sec)	Data protocols supported	Special services
Satellite Technology Management **Costa Mesa, Calif.** **(714) 557-2400**	STM	Costa Mesa	Planned	Yes	Conversational; conference	Yes	Control, monitor	STM	Leased transponder	None	Ku	512K/96K	Asynchronous, SDLC, X.25, ALC, HDLC, Digital Data Communications Messsage Protocol	Customized protocols and applications; VSAT as remote concentrator; mini-hubs
Tridom (AT&T subsidiary) **Marietta, Ga.** **(404) 426-4261**	Skynet Clearlink	Atlanta, New York, Los Angeles (planned)	Atlanta, New York	Yes	Conversational	Yes	Monitor	Tridom	Owned multiple (1993)	SCPC	Ku	512K/32K, 64K, 128K	SDLC, X.25, asynchronous, BSC, SCADA	Customized to user's needs; single source for equipment and terrestrial connections
Canadian Satellite Communications, Inc. **Mississauga, Ontario** **(416) 272-4960**	Satlink	Mississauga, Toronto (planned)	Planned	Yes	Conversational; conference	Yes	Control, monitor (planned)	STM	Leased transponder	Special order	Ku	514K/96K	Transparent HDLC, ANSI X.3, X.28, asynchronous, SDLC, X.25	Business television; videoconferencing; point-to-point via hub; hybrid nets
CNCP Telecommunications **Toronto** **(416) 232-6760**	VSAT-Service	Toronto	Terrestrial backup	Yes	Planned	Planned	Monitor	Scientific-Atlanta	Leased transponder	SCPC	Ku	56K/56K	SDLC, X.25, X.3, X.28	International X.25 net support; combined X.25 terrestrial packet net/VSAT support
Telesat **Glouster, Ontario** **(613) 748-0123**	Anikom 200	Toronto; Montreal; Western Canada	Montreal	Yes	Conversational; conference	Yes	Monitor	HNS	Owned satellite	SCPC	Ku	512K/128K	SDLC, asynchronous, X.25	One point customer contact; C-band available 2nd quarter 1990

Disaster recovery backup hub location = When a city is named, backup service is offered only from that location. The designator "All other shared hubs" means that backup services are available from all of the vendors' shared hub locations.
Voice capability = Conversational voice service is a product intended for WATS-type replacement. Conference service is a product that is suitable for group conferencing.
Video uplink service = All VSATs are capable of receiving video broadcast on the same satellite. Vendors that offer this service will uplink these broadcasts on their own equipment rather than via a separate facility.
Remote net management console = Permits customers to monitor their traffic via a remote display console or control their private network traffic operations.
Satellite capacity = Some vendors supply satellite capacity via owned transponders, whole satellites or multiple owned satellites. Others supply capacity that they have under long-term bulk lease or lease capacity on special order only.
Alaska and Hawaii coverage = SCPC service to Alaska and Hawaii requires separate satellite earth stations to provide a point-to-point link. Transponder footprint service can be received on VSAT remote earth stations and be integrated into the main VSAT service.
Satellite channel data rates = These channels provide multiple virtual circuits. Multiple inbound and outbound channels may be combined to provide any needed data capacity.
Special services = These are vendor statements as to their special capabilities.

HNS = Hughes Network Systems
NEC = Nippon Electric Co.
SCADA = Supervisory Control and Data Acquisition
SCPC = Single Channel Per Carrier
STM = Satellite Technology Management

This chart includes a representative selection of vendors in the VSAT services market. Most vendors offer other VSAT services, and many vendors not included offer a full range of competitive products.

SOURCE: COMMUNICATIONS STRATEGIES ASSOCIATES, INC., CUPERTINO, CALIF.

(continued from page 47)

you rely upon it? VSAT service suppliers are so confident of their service reliability that most offer performance guarantees. These guarantees are typically set at 99.5% total network availability or better. Different plans are also offered, some of which include only the shared hub service, while others include both that and the aggregate availability of the population of remote VSATs.

Under a typical plan, in any month that the service fails to meet its performance guarantee, the vendor provides a service interruption credit based on the level of performance and availability actually delivered. Vendors differ in the level of service interruption credits they provide, but the greater the downtime credit negotiated in your contract, the greater the vendor's incentive to keep you on the air.

Catastrophe backup

If service interruption credit is not a strong enough guarantee for you, then additional steps can be taken. A key strength of the VSAT approach is that backup can, in many cases, be built into the network at a considerably lower cost than a truly diverse, routed terrestrial approach. The cost savings depend mostly on applications and network sizes.

VSAT backup for equipment failures or natural catastrophes can be available on-line or on a delayed basis. Typically, vendors will include 48-hour or better partial service restoration from major catastrophes at no extra charge. If faster recovery is required, the cost per drop per month can increase $100 to $200.

These additional costs depend on which solution is chosen for the failures to the three major components of the VSAT net:

- **Individual branch office.** Backup can be provided via a terrestrial dial-up modem running on the telephone net during individual or group outages. These stations can dial into the shared hub or go directly to the host.
- **Shared hub.** VSAT shared hubs are fully redundant, and outages are rare. However, in the event of an earthquake or fire, vendors that own and operate multiple hubs will provide access to a designated backup hub. Vendors that operate only a single hub often have catastrophe backup-sharing arrangements with other hub operators. All backup arrangements should be closely examined, particularly regarding restoration times and the priority for restoration of your service vs. restoration of other customers. Host link terrestrial service, plus full or on-demand backup, will also be needed to both locations.
- **Satellite.** There have been no known failures of commercial communications satellites once they have been placed in operation. Nevertheless, it is important that you check out the technical specifications of the service being provided. What level of backup service is provided in the event of a transponder failure? Does the vendor own or lease space on multiple satellites to back up a total satellite failure? What time and level of service restoral does the vendor guarantee? What does the vendor charge for priority service restoral? What are the nonperformance penalties?

A key advantage of VSAT networks is that complete net management facilities are provided at Open Systems Interconnection Levels 1 and 2. This is in contrast to current terrestrial practice, whereby separate facilities often have to be used to monitor different portions of the network. Some service providers have made these facilities available to users, either through NetView interfaces or for shared hub operation; some offer a network management console that can be remotely located in your facility.

These remote network management capabilities can give you the best of both the shared and private hub worlds.

Even though someone else is operating the network, you can monitor all operations as if you had a private hub — if your provider offers a remote network management console. A few vendors also offer remote control capabilities that allow you to run some of your own net management activities directly.

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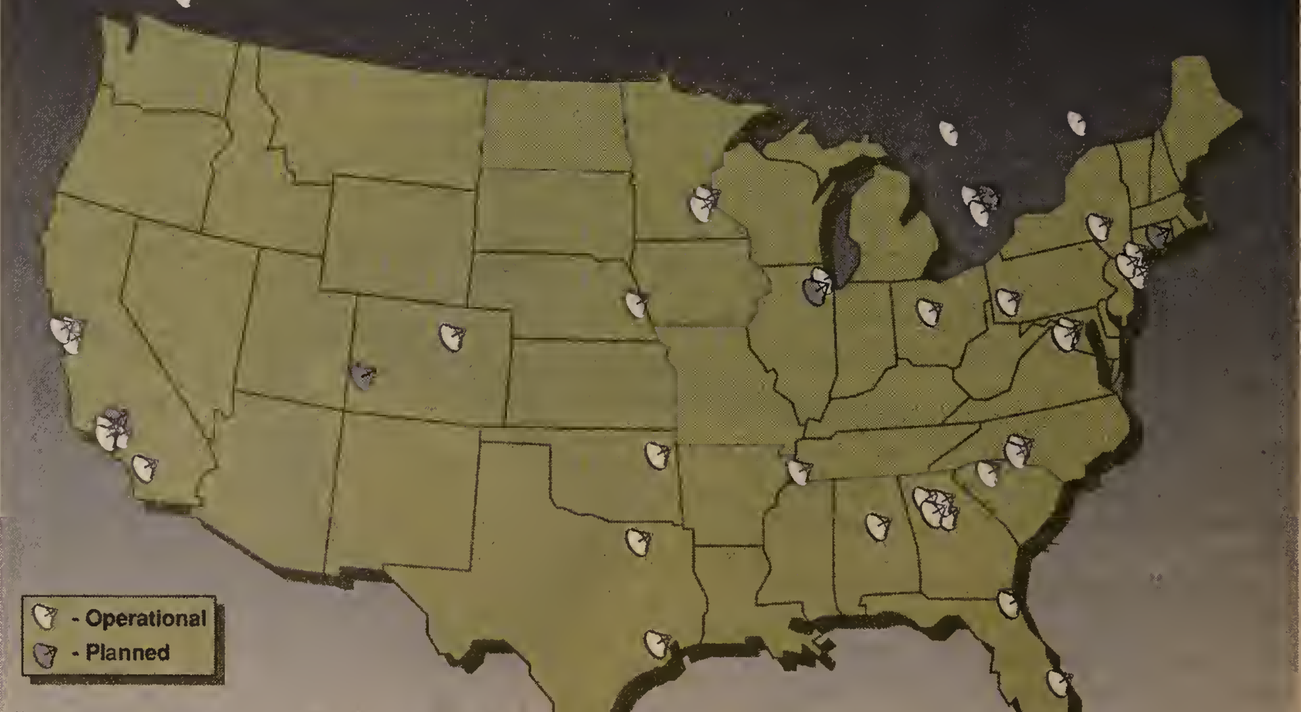
Shared hubs go nationwide



The growth of shared-hub VSATs, multiple users sharing services and costs, is making satellite communications more affordable across the continent.

GRAPHIC BY SUSAN SLATER

SOURCE: COMMUNICATIONS STRATEGIES ASSOCIATES, INC., CUPERTINO, CALIF.

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Plan for the worst

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geographical region. Many companies are able to bypass the local circuits through microwave connections to their long-distance carrier or cellular facilities.

Many companies regularly use cellular communications for their sales force but never think to rely on them in an emergency. Determine who in the company has cellular phones and plan to distribute more to critical function areas. Put together a company cellular telephone book so that people can contact each other in an emergency.

Finally, make sure that the disaster team is well versed in bypassing your long-distance carrier using 10-XXX equal access dialing. However, be careful not to issue companywide memos on this — 10-XXX access is more expensive, and you do not want users bypassing your regular long-distance carrier should they occasionally experience dialing difficulty.

■ **Step 7: Think of creative solutions.** Consider how other telecommunications providers can provide backup to your facilities. Some of the best known of these are hot-site data processing firms that will keep you operational by doing all of your computer processing. Some of them even provide backup PBX service. But what about other, less critical forms of communication, such as 800 order entry?

One firm caught up in the Hinsdale, Ill., outage turned to voice mail for the answer to some of its communication problems. During the outage, outgoing calls were not much of a problem. Company employees occasionally had to wait up to a minute for dial tone, but they could still make calls.

The problem was inbound service. The firm contacted several answering services in the area with working, in-bound voice mail systems. The company contracted with the services to receive calls into their voice mail systems at a base rate of $35 per month. The service was signed for and installed in one day.

To alert customers about the new system, the company's telecommunications staff prepared messages that were sent over telex, facsimile and overnight delivery services to distributors, announcing the new temporary telephone numbers for placement of orders.

At first, customers typically left a message for the salesman to call back, which was not really a problem since there was outgoing service. But as they got used to the system, customers began actually leaving orders on the voice mail system — quantity, requested delivery date, everything.

■ **Step 8: Design backup facilities through your own switches.** If a board blows in your PBX, you could easily lose telephone service until a replacement arrives. The best way to cover yourself against outage is to have key backup boards close at hand.

Many companies have nearby buildings with separate switches. By interconnecting these switches through off-premises circuits or even remote call forwarding, some traffic lost to an in-house PBX outage can be recovered.

■ **Step 9: Locate similar functions**

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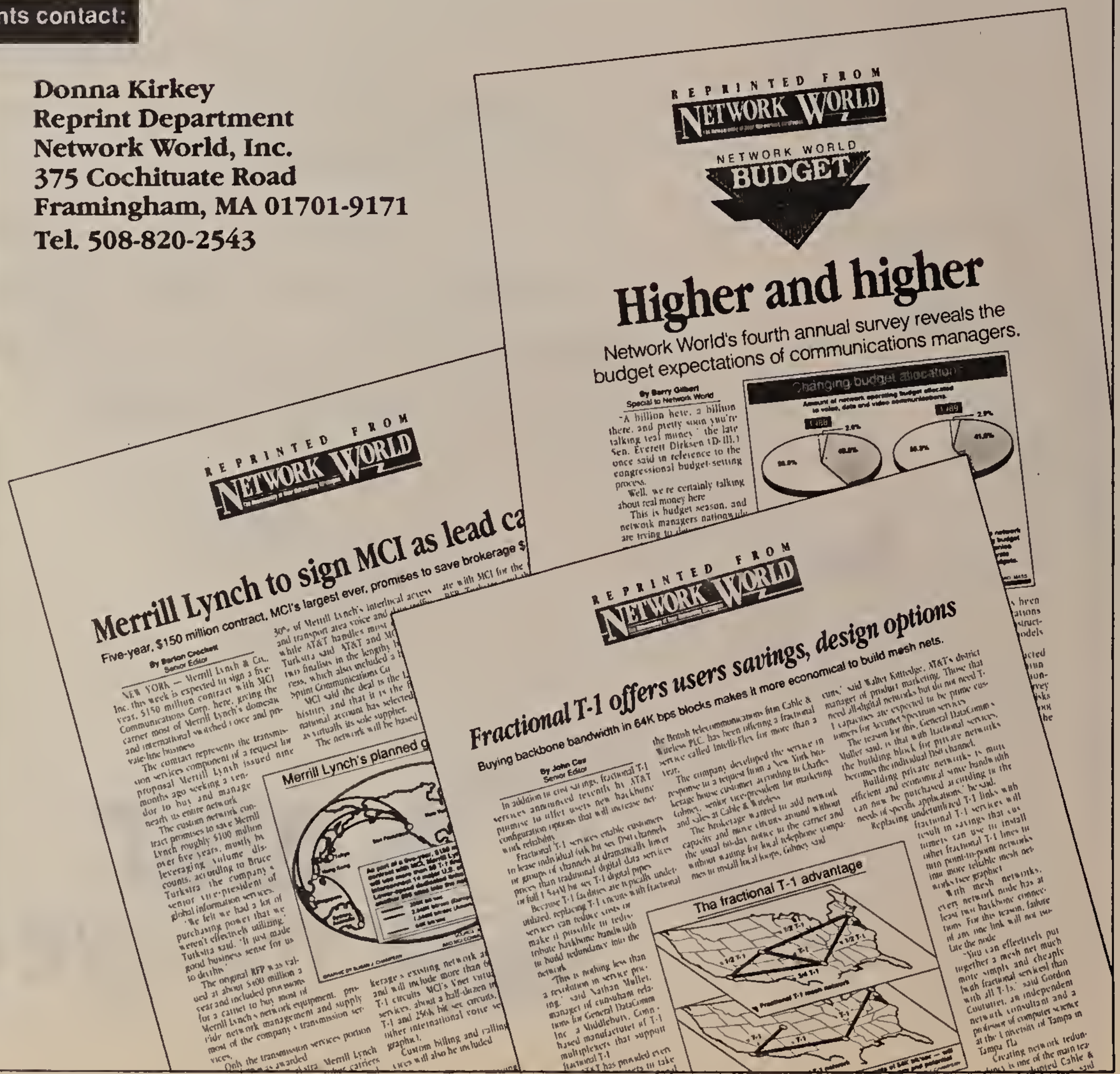
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The fractional T-1 advantage

One emergency plan played out

For one East Coast manufacturing company with nationwide operations and an order entry department that brings in thousands of dollars an hour, contingency planning is a priority. The manufacturer, which preferred to remain anonymous, stayed the following course to form an effective plan.

First, the firm examined its inbound and outbound circuits, in-house switches and the general needs of the order entry process. Diverse routing was obtained from the local telephone company to guard against cable cuts and central office breakdown. The user now receives dial tone from three different central offices.

A second focus was the firm's private branch exchanges. Since the company inhabits several nearby buildings, it links all its PBXs through off-premises circuits. This is called cross-restoral; if one switch goes down, the other can help carry the traffic.

The third area was the order entry department itself. The department had an emergency standby site located in a second nearby building — a bare room with large kitchen counters and telephone jacks. If an emergency occurs, this room is activated; telephones are plugged into the outlets and toll-free lines are rerouted to the site. The facility is activated through the use of AT&T's 800 Service Command Routing feature, which allows for emergency rerouting of toll-free traffic.

In an emergency, order entry personnel are transferred to the alternate location. Each carries an order entry disaster kit, which includes pads of order entry forms and other necessary items.

Everything from seat assignments to telephone station numbers is predetermined. While the data terminals are not transported or used, this system allows the company to maintain contact with clients, boosting dependability and maintaining financial viability.

The plan is detailed and, like any disaster recovery scheme, requires maintenance. As department personnel turn over, the disaster plan must be updated. New names must be assigned in seating plans and old assignments given to new personnel.

— Daniel Briere
and L. Thomas Walton

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The 4174 11L supports 64 coax and 24 ASCII devices plus a token ring.

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For example, for bulk file transfers between hosts, the LinkMaster 6100C network processor allows files on a host to be sent quickly and effectively to not just one, but multiple hosts in multiple locations.

The 6100C network processor utilizes existing channel connections for direct NetView interface.

MC

Using the LinkMaster 5000 series of channel extenders, disaster recovery backup tapes can be made offsite whenever they are needed, eliminating the time and expense of manual tape transportation.

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LinkMaster 4174 controllers interconnect 3270 terminals, ASCII terminals and PCs to multiple hosts, either DEC or IBM. And LinkMaster products enhance network management with direct NetView interface.

These are just a few highlight examples of McDATA's LinkMaster network solutions at work.

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DATA

In their image

continued from page 30

interest of the various groups," the report states.

Fortunately for U.S. companies, a well-established structure for participation in ITU activities exists, in delegations to ITU meetings and, perhaps more importantly, in designing and preparing U.S. positions and strategies.

Participation in Federal Communications Commission dockets seeking advice from the private sector is helpful, but personal participation in Consultative Committee on International Telephony and Telegraphy study groups is more effective. To join The Club, you must not only pay your dues but you must also attend the meetings.

Joining The Club means not only membership in users groups and participation in international organizations such as the ITU, but it also means establishing relationships with foreign entities. You, or your representative in whatever country your firm has targeted, must learn the practices and procedures of that country.

Know your stuff

It should go without saying that if your company has requirements in 10 countries, you must keep up with tariff changes, licensing requirements and even personnel shifts in all 10 countries. The day when a company could safely rely only on its principal international carrier to make all of its arrangements is over. Your influence and control over how you do business is no longer a function of whether your international record carrier's sales representative is savvy; it is now dependent on how much *you* know.

Again, in this respect, users are fortunate. The principal telecommunications providers in several major countries, themselves recognizing the need to establish relationships with major users — to become salespeople, if you will — have opened U.S. offices.

France Telecom, for example, recently celebrated its 10th anniversary of operation in the U.S., while British Telecommunications PLC, Kokusai Denshin Denwa, Ltd. of Japan and OTC, Ltd. of Australia also have U.S. offices to provide information and guidance about the services and policies of their telecommunications providers. Get to know these folks. What they can teach you will help you achieve the third element of user advocacy: showing your clout.

Show your clout

When telecommunications managers gather around the camp fire, all sorts of stories are told about how U.S. companies choose their foreign investment sites based on the degree of telecommunications liberalization enjoyed in that country. It would seem that this is the sole criterion for establishing operations in that country. But consider the source.

For example, at a meeting of accountants, the choices might be made on the basis of tax havens; at a gathering of employment specialists, the criterion may be a country's abundant skilled labor. It would be naive to suppose that a company is going to do business in a certain country only because the telecommunications policies meet its needs.

But it would be equally naive not to appreciate that telecommunications prices and policies play a major role in that decision and that telecommunications providers and politicians know it. That fact provides leverage for users in advocating governmental policy changes and in arranging for network services. This is increasingly true where large investments have been made in facilities. For most governments or service providers, it would seem better to add value to a network than to let it lie fallow.

If you doubt the clout of a large telecommunications user, study the commotion made this past spring about plans for international and domestic service by General Electric Co. and Merrill Lynch & Co., Inc. The GE case is especially interesting because its plans call for three major international providers — AT&T, France Telecom and British Telecom — to work together and with other telecommunications providers to create a homogeneous network connecting GE operations in 25 countries with transparency as to the service provided.

The day when a company could safely rely only on its principal international carrier to make all of its arrangements is over.

▲▲▲

Do you think British Telecom and France Telecom aren't delighted to be partners in this project? Doesn't this make you think GE has some clout?

Rules to live by

These, then, are three rules for effective user advocacy. Follow these rules and you'll help change the world and build your networks. But remember to follow these rules in order.

- First, join The Club.
- Second, know your stuff.
- And third, show your clout.

Con

continued from page 27

issue is similar to one that the postal service has confronted: Who owns an address? People's addresses are public knowledge. While home owners may not like the idea of junk mail, they still get it. Laws to protect them from abuse and fraudulent use of the postal system exist. As with junk fax, if CNI gets abused, legislation can be passed to curb that abuse.

Anti-CNIers hoping to stem the flow of personal information by stopping CNI signaling are going to be disappointed. In today's high-speed computer age, little will stop unwanted calls or invasion of privacy.

Already, mail order companies, credit card firms and others routinely sell customer lists — inclusive of telephone numbers, names, addresses and other demographic information — to anyone who wants to buy it. With greater intercomputer access and memory capacities, almost no information is private anymore.

It is the use, or abuse, of CNI that's at the crux of the issue regarding CNI-based services, not the signaling itself. It's how the information is used, not if it should be available.

No one complains that CNI is sent to the police or fire department in emergencies or that an operator can see the number of the calling party. But people complain if their calls are screened by friends using CNI. It becomes more of a question of company ethics and personal practices than technology.

For people concerned about corporations abusing their phone number, we should draw the line for CNI where direct mail companies do: When customers call a firm using CNI, they should be asked if they mind if demographic information is used for further marketing or sold to outside interests. If a subscriber does mind, the company can simply note that in the data base and not sell or further use that number.

There are instances when CNI can create problems for legitimate causes, despite laws to the contrary. One example is calls to recognized service organizations, such as substance abuse hot lines, which rely on anonymity.

In many cases, the situation could be remedied simply by advertising that CNI is not used. However, in some cases, it's not that simple, for example, local emergency aid lines such as hot lines for battered women. A victim calls the local hot line, leaves a number where she may be reached, and then the hot line contacts a volunteer at home or at work to return the call. The victims are never given the direct number for the volunteer to avoid any violence from their partners.

In this instance, CNI feedback could endanger the lives of the volunteers. But there have been many instances in the past when the public network has been adjusted for the purpose of accommodating the needs of certain minority groups — telecommunications devices for the deaf, free operator assistance for rotary phones and so forth. These were cases of necessity or clear public interest.

In similar CNI-related instances, the network should be rigged to avoid the passage of CNI to the terminating phone. A possible solution is to have the operator connect the circuit for the volunteer — somehow masking the call's origin in the process. Or calls could be bridged through local switching with the hot line center, giving the hot line central number instead.

This can be done without endangering CNI-based services as a whole. If the state public utility commissions start banning CNI-forwarded information to the long-distance carriers too, we will take one big step backward in being able to justify the expense of installing Signaling System 7 and a range of other ISDN and network capabilities.

Those who have been waiting for the telephone networks of the future, complete with shop-at-home services, can forget about it without CNI signaling passing through the network. All of this is at risk if the minority interests pushing privacy concerns persist.

If these people do not want their numbers disclosed, then they should bear the costs — all the costs — for that privilege. They're requesting a network special order, and like anything else, that costs extra. It's the same for unlisted numbers.

There are several ways to solve the problem. All 5ESS and DMS-250 switches are capable of assigning "phantom numbers" to telephone addresses, allowing users to send alternate numbers as their CNI.

Telephone companies could isolate a particular exchange for CNI phantom numbers, or users could buy a second outgoing-only phone line for making calls. If someone picks up the phone number using CNI and dials that number, the person can just not answer it or leave the ringer permanently off.

The customer would be charged extra — the cost of one outgoing line, typically $5 to $15 per month. Also, two-line phones could be installed at a minor expense. Anyone who doesn't like these options can build their own network.

This may sound backward and extreme — and it is — but it's as ridiculous as what the anti-CNI forces are requesting: the ability to selectively block CNI. CNI-based services, to be of benefit, must work universally. The telephone companies should not be required to provide blocking if there is insufficient demand to justify the cost of providing it.

Sooner or later, the anti-CNIers will have to realize the horse and buggy days are gone, and the newer vehicles are taking over. As a result, the roads will be faster, cleaner and more productive for everyone.

Letters

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should never give up what privacies we still have because once they are gone, they can never be recovered.

When you claim that CNI will end harassing phone calls, you must be more specific about what you mean. Mechanisms are already in place for the criminal justice system to trace and prosecute those who place obscene and abusive calls.

If you mean advertising and junk calls, you may hang up on them as readily as you toss "occupant" mail into the trash. Will you next have the post office screen your mail? If you call the hardware store to inquire about the price of widgets, do you want to end up listed as someone who's interested in widgets in a data base sold to widget salesmen?

Regarding the future "computerized telephones with built-in data bases that will selectively accept, reject or forward calls," such devices already exist. (Forwarding is probably in the near future.)

Your analogy to opening the door to a stranger does not at all fit this situation. One cannot always resist a forceful stranger, but you can always hang up your phone.

Data pertaining to the origin of a telephone call is just as much a part of the information content of that call as the actual voice conversation, which has long been protected from eavesdropping. Yes, the phone companies know where calls come from, but you and I are only privy to that information on our own accounts.

There are very real and personal reasons why people have unlisted numbers, and they should not be forced to have their privacy violated for corporate convenience, which is what CNI really is.

I can think of no benefits CNI could bring to the ***private*** subscriber, and note that this is a ***privacy*** issue.

This country has never allowed the rights of the individual to be compromised for corporate interests. I don't really care if a credit card company saves money routing my call wherever it has to go.

Our freedom and our privacy are mutually dependent and inseparable. We don't yet carry national identity cards, and making a telephone call should not be like crossing a border checkpoint.

William Lynn III
Principal engineer
Lockheed Corp.
Hampton, Va.

Gary Beach, Publisher, *Network World*

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Answers for the Information Age.

Pro

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dential — with the equipment to see or use it. This availability would become a standard part of business service, although the operating companies are sure to press for an additional charge for CNI availability.

Residential users would have the choice of making their own numbers available to businesses they call, to residential users or to both. There might be a nominal charge for residential subscribers to change their options, but there would be no charge for CNI to be available if the central office switch can provide it.

Under no circumstances would directories of phone numbers and subscribers show which options were chosen. Even users with unlisted numbers could make their calling number available if they wished.

As an added cost feature, residential subscribers could have the option of preventing their number from being identified on a call-by-call basis through entering a code prior to dialing a number. This would be useful when a user calls a store for information.

CNI would always be available for such emergency services as 911 lines and fire and police departments — from both business and residential lines.

Crank and obscene calls could also be handled with minor changes to central office switches and their software. A user who receives such a call could press the star and pound keys simultaneously, or some other combination, which would store the numbers of both the called and calling parties in the switch or on the station message detail recording file.

This way, the calling party would know that the call information was being recorded. The call information could be accessed by the operating company at the request of the police or its own security staff without necessarily disclosing anything about the number of the calling party to the called party.

The Federal Bureau of Investigation, Central Intelligence Agency and National Security Agency would certainly want to make use of such a capability, with proper authorization.

CNI is one of the few tangible services that Integrated Services Digital Network technology has to offer so far. Finding a way to make it both useful and palatable is possible with some minor changes in existing switches. ISDN, in the form of Common Channel Interoffice Signaling (CCIS), started as a means to cut carrier costs by freeing circuits during call setup. This allowed 10% to 15% more calls over existing circuits.

Not content with cutting their costs, carriers and post, telegraph and telephone administrations around the world want to add to their revenue from their installed plant by providing additional services that few users may want. Fine, as long as doing so does not interfere with our rights to peace and quiet.

But just as the telephone industry saved a lot of money from push-button service while making users pay extra for it, the industry will also want users to pay for CNI and other ISDN services. Additional charges should be unnecessary since the CNI information is already available in all of the supporting equipment via CCIS, Signaling System 7 and ISDN.

If there must be a charge for such a "service" — and such an unnecessary charge seems inevitable — then put the burden on those who would benefit: the businesses that use CNI and the telephone companies that make money with little added investment. Don't charge the residential subscriber for receiving incoming CNI, or for allowing or blocking outgoing CNI on a permanent basis.

As many firms have already found out, using CNI in an intelligent manner, without scaring and intimidating calling parties, takes some careful planning. So does introducing the use of CNI by all subscribers across the country.

Rather than the all-or-nothing approach, which comes naturally to the monopolistic telephone industry, introduce some additional capability that could add some real value to a lot of paying customers.

Making outgoing CNI optional for those who would benefit and allowing the telephone industry to achieve some revenue from what is actually saving them money can all be accomplished with the suggestions provided here.

If you agree, just send this article to your congressional representative, the Federal Communications Commission and your state Public Utility Commission.

A VSAT in your future

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With the free trade agreement and growing business operations in Canada, service to that country has become a consideration for many users. Currently, three major Canadian carriers — CNCP Telecommunications, Telesat Canada and Canadian Satellite Communications, Inc. — provide services similar to those offered in the U.S.

However, a significant problem remains for the network operator that needs to provide service to both countries. Regulatory restrictions prohibit transmission of all but incidental two-way services — meaning to less than 10 sites — across the border.

"Even if a U.S. satellite is used, the current regulatory practice is that users must use a Canadian satellite if more than six to 10 locations are served," says Dan Hector, director of satellite services for Toronto-based CNCP. "Handing your traffic off to a Canadian service provider via a terrestrial link at the border is a viable method of serving your locations in Canada, particularly for Northern cities such as Edmonton [Alberta], where U.S. satellite signals are very weak."

Some nets require service to Alaska and Hawaii. VSAT links to those states are very cost-effective compared with their high terrestrial service cost. Evaluate the footprint of your VSAT supplier's satellite if 50-state coverage is an issue. Direct service via your VSAT net system usually costs less than implementing separate single-channel-per-carrier links to serve them.

Most important vendor trait

The most important characteristic a VSAT services vendor can have is a willingness to permit you to modify their standard contracts to fit your requirements. It will do you no good to evaluate the higher reliability and performance available from VSATs if you cannot get a meaningful and detailed description of the performance level for your individual network, methods of testing and remedies if the service is not up to snuff.

Obtaining five-year contractual price protection won't do you any good if the contract is full of specialized satellite technical loopholes permitting exceptions to service interruption credits or levying additional charges.

"We feel that the [contractual] process is not only lengthy, but very challenging," says Bob Riemath, director of support systems at Seattle-based Univar Corp., a distributor of industrial, textile and agricultural chemicals. "It is a complex process compared to dealing with the phone company.

"You need to set aside significant time for the contract analysis and negotiations process — in some cases, more time than you allowed for the RFP and vendor evaluation," Riemath adds. "You must go into greater detail and validate your previous RFP assumptions, as you could be putting your business at risk if your assumptions were wrong."

Riemath notes that his company "found that the contracts were difficult to follow. You need specialized VSAT technical, as well as legal, assistance. We think that it was wise for us to bring in specialized VSAT technical and legal assistance to support all phases of our contract and precontract evaluation processes."

As shared hubs, on-line backup and service reliability provided by VSAT nets, and the capability to contractually define its parameters for five or more years increase this new service's appeal, you may soon find a VSAT in your future.

Plan for the worst

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and processes. In large firms, critical revenue functions such as customer service and order entry are often duplicated at other company sites around the country. Find places that can act as a backup to your site's key functions, so that traffic may be rerouted to them in an emergency.

The classic example of this is inbound 800 numbers. Most carriers offering toll-free service permit customers to reroute traffic to alternate locations for disaster recovery. These are preprogrammed routes that may be implemented automatically or on demand.

■ **Step 10: Develop disaster and training procedures for personnel.** This is one of the most important areas of concern. Companies must be able to move people and processes quickly and efficiently to maintain strategic business functions.

To accomplish this, managers must let the personnel know exactly what is expected of them. Each person should have explicit instructions as to where to go and what to do in an emergency, whether or not the manager is present.

Have departmental heads on your disaster team establish and discuss plans of action for each member of their staff. If people have to move to other buildings, tell them where they will have to go and how. Will there be a company vehicle? Will they take their own cars? Where will they sit in the new facility? What will their new phone numbers be? Nothing should be left out.

Develop emergency kits consisting of key forms and equipment so that functions can be sustained. If you rely heavily on computer display and entering of information, develop paper-based alternatives.

Companies must be able to move quickly to maintain business functions.

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And don't forget new personnel. When they go through training on the phone system, make sure they are also briefed on the contingency plans. If there is an alternate site nearby, make sure they tour it.

■ **Step 11: Test your plan thoroughly.** Worse than no plan is having one that is not exercised or tested.

Test in-place plans at least twice a year. Test the most critical areas more often. See how the plans work without key management personnel involved. Actually operate your business using backup arrangements. Don't be scared to fully simulate an emergency; for instance, don't let people into a room if it was supposedly damaged by fire.

One company forgot this lesson; key disaster recovery documents were kept in the telecommunications department. When a real fire happened, the fire chief wouldn't let the telecommunications manager back into his office and the plan went haywire from the start.

Have multiple numbered copies of the plan available. Store one with your backup software files. Make it part of the training process that other key members know where all the copies are located.

Worse than no plan is having one that is not tested.

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Above all, think *details*. Is everything available for personnel to resume operations in the case of an emergency? If rerouting is supposed to occur, how many people are authorized to OK the rerouting in an emergency? How will they make the calls? These kinds of problems will surface as you test your plan. The more realistic the plan is and the more seriously you take practicing recovery, the better your firm will weather a crisis.

■ **Step 12: Look for changes in your firm's needs.** One firm divested a division that was responsible for a major portion of backup facilities in the event of a failure. Had the firm not redesigned its plans to allow for another means of recovery, its data processing capabilities would have halted in a disaster.

Don't wait

When designing, maintaining, or modifying a telecommunications system, think "recovery, recovery, recovery" every step of the way. Strive to integrate recovery solutions into your company's day-to-day operations. A passive, alternate cable path that must be manually activated in an emergency is much less desirable than an alternate path over which half of your network is operating dynamically at all times. That way, if one cable path is cut, one-half of your voice and data service is still operational.

Look at contingency planning as a business need. Call your telephone company and carrier account representatives, and ask them to evaluate your system for disaster planning. Don't wait until it's too late.

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Hewlett-Packard a pioneer

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HP uses codecs from Compression Labs, Inc. in San Jose, Calif.

This summer, HP migrated the videoconferencing traffic off satellite transmission facilities and onto the company's private global voice and data network. By moving the video to the terrestrial net, HP divisions no longer have to purchase satellite equipment or pay satellite transmission fees.

Today, a division can implement videoconferencing for $90,000 to $100,000, Taylor said. The biggest expense involves buying a codec, although the cost to outfit a special conference room with color monitors, cameras and special lighting also contributes to the final bill.

But unlike its satellite hookup, the cost of transmitting video across HP's private net is no more expensive than making a regular telephone call, Taylor said.

HP initiated videoconferencing to facilitate communication among groups of geographically dispersed people collaborating on projects, Taylor said.

HP also has established videoconferencing links to outside companies. Unfortunately, it can only establish video links with companies that use the same codecs. Also, the other company's local phone company must be able to support digital transmission on the local loop.

Despite these limitations, HP has held videoconferences with other companies on about 25 occasions, and Taylor said the practice is bound to increase.

"Intercompany videoconferencing will be the way of the future," Taylor predicted.

Firms farm out work

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Policyholders mail claims to a post office box at John F. Kennedy Airport in New York, where they are flown overseas and processed using network links to the U.S.

A New York-based start-up company, Global Office Technologies, plans to use workers in the Philippines to do medical record data entry specifically for the U.S market. The company's executive director, Renan Paglin, says he is seeking a share of the estimated $15 billion market for medical record data entry services.

Paglin says that he can pay Filipinos 10% of the average $22,000 salary workers earn in the medical record data entry industry in the U.S. He estimates that communications costs will be about 20% of his total expenses because the medical records will be transmitted to and from the U.S. via network links.

A recent *Newsweek* article reported on a job undertaken by the Chicago-based consulting firm Arthur Andersen & Co. to upgrade the operating system of a hospital complex in Atlanta. Arthur Andersen turned the job over to its partner in Manila, Philippines, and from there, workers were hooked up to the Atlanta mainframe via a network link. Over a 15-month period, workers in Manila completed the job for only one-third of what it would have cost to perform in the U.S.

Improving economies

Several developing countries see this trend as a way to boost their economy. One such country is India.

The Indian government hopes that by offering generous incentives to entrepreneurs and multinational corporations, it will be able to seize a portion of the estimated $300 billion software market by the year 2000. As part of this effort, a satellite teleport is planned in Pune, India, that would be adjacent to a technology park populated by software design firms.

India's huge pool of English-speaking engineers and scientists makes it conceivable that the country could achieve its aim.

Already, several U.S. companies use India for software programming services. Many of them link up to their remote work forces via satellite. Among the companies that use Indian software services are AT&T, Citicorp, Digital Equipment Corp., Hewlett-Packard Co. and Texas Instruments, Inc. Companies contemplating using India for software services include Ashton-Tate Corp., Intel Corp., Microsoft Corp. and Sun Microsystems, Inc.

> Over a 15-month period, workers in Manila completed the job for only one-third of what it would have cost to perform in the U.S.
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Commenting on the high quality of software programming work done abroad, Ed Yourdon, publisher of *American Programmer,* wrote in the magazine's May 1988 issue, "If the software industry does not wake up to the possibility of software development moving offshore, we may just be another U.S. industry that was asleep at the wheel."

Other American industries face a similar risk, unless they too pay close attention to the economic changes wrought by improvements in international network facilities.

New measures for evaluating IS

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Clemons cites several common errors in evaluating strategic information technology investments. One of the most common is considering soft benefits only at the end of the decision-making process.

"A whole generation of MBAs has been taught to look first at the returns they can easily quantify," Clemons said. "Soft benefits are considered at the end of the decision-making process, when choosing between two investments with a similar return."

Clemons said this traditional method of evaluating return-on-investment leads users to underestimate the value of soft benefits. He said many firms try to compensate for this by predicting dollar values for soft benefits. Yet calculating such dollar values is risky because the dollar impact of soft benefits is largely unpredictable.

Users often deal with this risk by "expecting a much higher rate of return" from soft benefits. In other words, a manager may decide to go ahead with a project if the quantifiable return-on-investment is 10% per year. If the benefits are soft, and inherently unpredictable, the manager may choose to proceed only if the expected return is much higher, such as 35%.

Clemons said managers take this approach to protect themselves in case the soft benefits do not yield the expected profit.

But the problem is that users wind up investing far more frequently in projects that generate easily quantifiable savings, rather than in projects that produce soft benefits. And since soft benefits are the stuff of which real competitive advantages are made, Clemons said many companies miss opportunities to invest in what could be highly successful strategic information systems.

"It's not a proper way to deal with the risk," he said.

In the papers, Clemons offers alternative approaches for evaluating strategic information technology investments.

One approach is to create a "decision tree." Companies taking this tack evaluate their options using their best guesses about how their competitors and the market will react.

With the decision tree approach, managers write down options, as well as predictions of what would happen if the options were pursued. Often, a decision can then be logically deduced without ever quantifying an expected return on investment.

Clemons said the New York-based brokerage firm Merrill Lynch & Co., Inc. used this approach to justify giving its competitors access to a strategic bond-trading and price-quotation network — called the Bloomberg System — in which Merrill Lynch owns a major stake.

Previously, only Merrill Lynch traders had access to the network. They believed the net gave them a competitive advantage by giving them better information than other traders had. But, according to Clemons, Merrill Lynch decided that other brokerage firms could build a competing network of their own.

By opening access to the Bloomberg network, Clemons said Merrill Lynch believes it can preempt other brokerage firms from building their own nets. Merrill Lynch can also use the Bloomberg network as a major new revenue source.

Not business as usual

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logical units would run across the network and then develop macro commands to process each.

The problem was that most net administrators could not be sure in advance how many programs would require a communications line at one time. Thus, they really did not know how many logical units would be needed.

"No problem," you say. "Just define the maximum number that you will ever need." Sounds reasonable, doesn't it? Well it's not.

Every logical unit you define takes up some storage, even when idle. If you were to define 60 and only need one, a large amount of the nodes' resources would be wasted.

Systems programmers and administrators would also dislike the tedium that would be involved in defining so many logical units each time they add a new node.

By the mid-1980s, things had changed considerably. It was becoming clear that the future of data communications was going to be in "program-to-program" communications instead of "program-to-terminal." Today, there is a better way of handling multiple communications sessions across a single line.

"Parallel sessions" occur when there is one logical unit on each end, but those two logical units could open and close as many sessions on a single transmission line as necessary.

For efficiency, a maximum and a minimum number of sessions can be defined to each logical unit; if the two logical units have a different number of sessions to support, the logical units "negotiate" their differences.

Parallel sessions offer these advantages over multiple logical units: simplified operation and resource definition, reduced effort for problem determination as well as less storage overhead.

When designing modern transaction processing or bulk data transfer systems where multiple transmission of sessions over a single line is involved, seriously consider parallel sessions. But heed this warning: You need to use LU 6.2 *and* PU 2.1 to properly support parallel sessions. Lack of either could preclude parallel sessions because IBM requires its front-end processors to check for both.

It is also important not to fall into the trap of using the old-fashioned LU 0 for new applications. Doing so would not only prevent you from traversing new IBM routing nodes but also would forever restrict you to inter-VTAM parallel sessions only. LU 0 parallel sessions are a dead end to avoid.

NetWare applications bow

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this assessment.

"Even Novell was amazed at how fast we got our first NLM working," said ISICAD spokeswoman Karen Kershaw. "Our developers went to Novell's five-day training course and then came back and wrote it overnight. The [Programmer's Workbench] tools that Novell put out work."

That first ISICAD NLM addresses the hidden-line removal process that turns three-dimensional CAD drawings into renderings of solid objects — a very CPU-intensive task that ties up the designer's workstation. ISICAD has built an NLM that performs hidden-line removal in the server, freeing up the workstation for design tasks.

"NetWare 386 brings the benefit of client/server computing — the ability to do distributed processing tasks across a network — to PCs," said Kershaw.

Palo Alto, Calif.-based cc:Mail, Inc. is turning its cc:Mail Gateway, a workstation-based product that lets cc:Mail users on remote local-area networks exchange messages, into an NLM. The company is also identifying certain "processor-intensive, occasionally used tasks" within its cc:Mail system as likely candidates for conversion to NLMs, according to Flip Whalen, vice-president of marketing for the company.

For example, the automatic message notification feature in cc:Mail is a terminate-and-stay-resident (TSR) task that runs on the workstation and polls the server periodically for messages. This function can be turned into an NLM and thus off-loaded to the server, with the server automatically notifying an addressee as soon as a message is received. As a result, the TSR task on the client would only have to listen for messages from the server, so it could be much smaller in size, Whalen said.

Users debate newer roles

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There is a spectrum of new services for those people who don't want to own networking subsystems themselves: disaster recovery, operational maintenance, network planning services, on-line network control management. Are these types of special service programs appealing to you as users?

Overlan: The answer is, like most things in life, yes and no. No. 1, I think it depends on how you view your own internal resources. How critical are they to you? How strategic are they to you? The answer to that would lead you to one direction or another, it would seem to me.

Let's say you just got rid of your entire operational staff and put an outsider in place. But you find out they aren't performing up to snuff. Now you have to admit you made a mistake. None of us likes to do that.

If you spend a certain amount of money, then there's no such thing as a mistake. Every company has a certain bogey, maybe $10,000 or 25,000? Over and above that limit there is no such thing as a mistake. I've been in business 25 years, and I have never heard anyone say, "Listen, Charlie, I just blew $75,000 . . . so I made a mistake."

If, in fact, they don't perform up to snuff, you have to admit that you made a mistake and you have to gear up again to do it yourself. And that's no easy task.

Then you're not in favor of farming out service or operations to a vendor?

Overlan: I don't think any of us would mind getting rid of basic repairs. That would be kind of fun — if I didn't have to tell the vendor, "Your people were going to have this up three hours ago."

The question is, who can do it in a complex network? We are a relatively midsize company, but we have four, five or six vendors hanging off the network. Right now, I am not sure that I know someone who can really do that effectively.

The other constraint is, who can do it economically? In a way, there are a lot of advantages in giving it to a third party, but you had better be sure you're right. Because if you are wrong, gearing up to do the same thing again could be an extremely difficult task.

Are users consciously looking to pare down the number of vendors they deal with?

Overlan: Go back to predivestiture; it was simple when it was only the Bell systems. If you really want simplicity, we can rescind all of the deregulation.

The fact of the matter is that it is in our professional interests to have a lot of vendors. It seems to me that the more vendors supplying things, or the more sophisticated the vendors, the more need there will be for someone who is sophisticated enough to judge what is best for the individual company.

From a professional point of view, I think you'd like a lot of vendors, and probably from a cost point of view, you'd want a lot of vendors.

In the administration of LANs, you don't want many different vendors, do you?

Finn: That's right. We want as few vendors as possible because too many vendors raise connectivity concerns.

I'm not too worried about pricing. We get good pricing, or we go out and get bids from other vendors. We depend on our vendors; they become reliable with us. We know who we can trust.

Stearns: I think we'd all agree that competition is a good thing. The idea of having one vendor, though, is probably more important to you in terms of having a relationship that you have faith in, not a de facto technology solution that you become dependent on.

Overlan: There's where the relationship is changing a bit. That is, I use Network Equipment Technologies [Inc.] as my T-1 mux vendor. If I bring Codex in, I am going to want them to know what is connected to my network. Whereas, in the old days, most vendors would come in and say, "I stop here and everything looks great."

We don't allow them to do that anymore, whether it be a PBX vendor or a T-1 mux vendor. I think that is really profoundly different. ◘

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CMA chief surveys role

continued from page 1

communications needs. Sometimes the word strategy means spending today's dollars to reap tomorrow's benefits. The problem, however, is that we, as telecommunications managers, are judged by what we spend today, not by how well we're planning for the future.

A lot of people are calling for communications managers to better understand business issues. Do you agree?

Recently, I attended a focus group of 11 telecom professionals, and as hard as the session leader tried, she couldn't get the group to talk about anything but technology. Finally, she asked the group, "How come you won't talk about business applications?" Someone in the group responded that telecommunications managers provide the communications highway, not the applications that go on it.

It's important for network managers to stay abreast of business concerns so they can accurately plan for the amount of traffic the network is going to carry. They need to know in advance if their company is going to acquire another firm or sell off a division. Telecommunications managers need to know their company's business plans so they don't start a project they will have to rework a few months later.

How do you suggest that network managers get more business experience?

There are many ways. There's no reason why a manager can't have lunch one day with the head of finance just to get a feel for what's involved in making financial decisions for the company. Or they can have coffee with the vice-president of marketing just to pass ideas back and forth. That's exposure.

I also think it's important to expose senior management to technology. We need to inform upper management about what it takes from a communications standpoint to consolidate offices, open a new branch or merge with another organization. They need to understand the time frame for getting carriers to provide new services or equipment; they have to know we have little control over the time frames. It's the law of the land.

What are the staffing issues facing network managers today?

[One is] the ability to hire people who agree to specialize in certain areas. As technologies get more advanced and complex, it's necessary for network staffs to specialize.

For example, the person who does voice traffic analysis has enough trouble keeping up with tariff changes, let alone trying to get involved in the data area. The problem is that the people don't want to specialize because of career concerns. No one wants to be known as a voice or data person. Everybody wants to get into both areas, and that's difficult to do — except at the top. Most people don't want to be pigeonholed in a way that would limit their future career possibilities.

What advice can you give network professionals who want to advance their careers?

We need to elevate ourselves from the technician level to the business manager level because that's the career path within our organizations. If communications managers want to move up, they're going to have to get the technician label off their forehead and turn into a business person.

A number of companies have recently decided to farm out control of their network operations to third parties. Is this a growing trend?

I don't see this as a serious trend for everybody. There are some organizations that will always want to maintain control of their own nets, and other companies may not be large enough to interest a vendor in bidding on such a project. However, it's a far cry from a number of years ago when all we were hearing was "Be your own Bell."

I wouldn't want to farm out my complete network operations or equipment or carrier selection to an outside party. I believe I can best serve the interests of my corporation by managing the network directly. But, then again, I don't have 300 people in my telecommunications department.

What technologies are having the greatest impact on user networks?

Without a doubt, fractional T-1. A year ago, none of the major carriers were really talking fractional T-1; today all three are.

Fractional T-1 will help users cut or contain costs. It provides a platform that is more easily expandable as a company's communications needs increase. It will make it easier and less expensive for companies to implement new technologies such as videoconferencing. Fractional T-1 will help us keep the bandwidth costs to an acceptable level.

Also, voice processing is one area where telecom managers can use technology to truly affect the way an office operates. Most of the time, we just provide a network facility to run applications designed by DP. But with voice processing, we can actually go into an office and change the way it functions.

By voice processing, I mean automated call distribution, voice mail and, eventually, voice recognition.

What can users expect from long-distance carriers in the future?

We will see increased competition in the long-distance arena. AT&T's main competitors are no longer satisfied with being niche players. They are now very mature organizations that are perfectly capable of handling all of a customer's traffic.

This is good for the users because it provides more options and better pricing. Users who choose to remain strictly with one carrier will probably be able to negotiate some attractive discounts. Companies that choose a multicarrier scenario will be able to get equal quality service from all carriers.

After the fire that knocked out the Hinsdale, Ill., central office, Hurricane Hugo and the San Francisco earthquake, what disaster recovery issues are of primary importance to users?

Most users want to see cost-effective disaster recovery options from the BOCs. I'd like to run circuits from our main data center through two BOC central offices for some kind of redundancy or at least a 50% backup. We have a feeling that's going to be a very expensive alternative. It can be done, but right now, it's all special arrangements and special tariffs.

The BOCs shouldn't charge an extraordinary amount for that backup. My company now has all its dial backup lines going through one central office.

If that office goes dead, not only have I lost my data, [but] I've also lost my backup. We'd like to have at least half our dial backup come out of another central office.

Have recent Integrated Services Digital Network announcements by vendors, ISDN trials and demonstrations at major conferences changed users' attitudes about ISDN?

User interest in ISDN may have peaked. The big issue at the Tele-Communications Association conference was fractional T-1, not ISDN.

There are some significant challenges facing ISDN today. First, many experts believe Basic Rate Interface will be obsolete by the time it's deployed because it doesn't offer users the same speeds they can obtain using local networks.

Second, many users will resist paying premium prices for ISDN unless they ascertain that there are some identifiable benefits. This goes back to whether network managers are willing to spend today's dollars for tomorrow's benefits.

Last, many users are beginning to find out that fractional T-1 can already do things that ISDN is proposing to do.

Not suprisingly, most users have a wait-and-see attitude.

TI embraces X.400 for EDI

continued from page 1

munications umbrella."

TI will begin beta-testing X.400 transmission of EDI documents early next year, and it expects to exchange EDI documents using X.400 with about 12 U.S. trading partners and perhaps three times as many European partners by the end of 1990.

In addition to supporting EDI, TI currently plans to use X.400 to send electronic messages, as well as sophisticated graphics such as those generated by computer-aided design and manufacturing systems, Sturrock said. TI is also considering using X.400 to send digitized voice messages.

> "Our aim is to make it as easy as possible to do business with us," Sturrock said.

Two weeks ago, TI contracted with MCI Communications Corp. for its MCI Mail XChange 400 service, which enables X.400 users to exchange messages with one another or any user attached to MCI Mail. The service will be cut over sometime in early 1990. The value and length of the contract were not disclosed.

Today, TI can exchange EDI documents with trading partners but not free-form text messages.

"We decided to implement X.400 because many of our trading partners wanted to send us text messages in addition to EDI," Sturrock said. "Using X.400 to link incompatible systems seemed like the most logical step."

Once TI adopted X.400 for electronic messaging, it decided to use the standard transport protocols to support EDI with other trading partners that have X.400 capabilities, he said. These firms include Fortune 100 companies that are using X.400 for messaging or developing X.400 software commercially.

TI plans to use X.400 to exchange EDI documents with a large portion of its 1,000 EDI trading partners in the next five to 10 years, Sturrock said.

Meanwhile, TI will continue to support a multiplicity of communications protocols and EDI standards to communicate electronically with trading partners and other outside groups. These include IBM's Systems Network Architecture, asynchronous protocols and X.25.

"Right now, X.400 provides one more option for communicating with outside companies," Sturrock said. "Our aim is to make it as easy as possible to do business with us."

Currently, TI uses a proprietary communications gateway to other networks that support a variety of protocols. The company will rewrite portions of the gateway software to enable interconnection with MCI's XChange 400 service, Sturrock said.

TI chose MCI from among several value-added network providers bidding for the contract because of its technical capabilities, especially directory services for X.400 messaging, Sturrock explained. MCI also won the contract because it has displayed a substantial commitment to deploy X.400 standards in its own network and is seeking X.400 interconnections with other value-added service providers.

Group to tackle SMT applications

continued from page 6

disable faulty nodes.

Advanced Micro Devices, Inc., Interphase Corp., Lawrence Berkeley Laboratories, National Semiconductor Corp., SBE, Inc., Sumitomo Electric and the Centre European for Nuclear Research (CERN), the European nuclear and physics research laboratory, are also charter members of the SMT Development Forum, McClure said.

Each of the SMT Development Forum member organizations, with the exception of CERN, has representatives on the ANSI X3T9.5 FDDI committee, McClure said. Besides the current crop of vendors and the two research labs, the forum hopes users will back the effort, he said.

"The SMT Development Forum is trying to attract end users that already have networks in place and plan to quickly migrate to FDDI. We're currently talking to several end users that participate in the X3T9.5 committee, including Boeing Computer Services Co.," McClure said. Boeing could not be reached for comment at press time.

The forum's goal is to ensure that each vendor's individual SMT FDDI implementations provide complete multivendor interoperability, thereby accelerating user acceptance of the emerging FDDI ANSI standard, McClure said. The SMT Development Forum members will participate in bimonthly meetings to complete a technical specification for SMT, he said.

Sticking point

The ANSI X3T9.5 FDDI committee has finalized specifications for about 75% of the FDDI standard. The sticking point over the past year has been the SMT network management portion.

McClure explained that the SMT ANSI working group expects to submit a SMT final draft standard to the full ANSI committee in early 1990. Interoperable FDDI products should hit the streets by mid-1990, he said.

DG unveils E-mail gateway

continued from page 2

applications in a multivendor network environment.

The company's first DAA product was Comprehensive Electronic Office Object Office, which integrates the company's minicomputer applications, such as electronic mail, filing and print services, with applications on networked microcomputers ("DG puts teeth into its network strategy," *NW,* Sept. 18).

Communications Server translates documents from the format of the software running on the Eclipse/MV to one of the other formats it supports. It uses X.400 as an intermediate format for the conversion.

A Comprehensive Electronic Office user, for example, could address a message to a user in another net environment, send it as if the recipient were on the same net, and the Communications Server would convert the message to X.400 as an intermediate step and then convert it to the recipient's format, such as SNADS.

The X.500 support also brings the product into compliance with a standard that's growing in prevalence. "X.500 will allow for true global addressing when many of the other systems begin to convert to X.500," said Joe Forgione, director of DAA marketing.

The software has three components: peer gateways, client application services and application platforms.

Peer gateways perform document conversion among X.400, Comprehensive Electronic Office, SNADS, fax and telex. Future gateways will support IBM's Professional Office System, Unix's Simple Mail Transfer Protocol, Wang Laboratories, Inc.'s Wang Office and Digital Equipment Corp.'s All-In-1.

The client application services portion of the software enables DOS-based personal computers to access the gateway services on the Eclipse/MV over an Ethernet or token-ring local-area network connection or via an asynchronous dial-up link.

The applications platform software running on the DG minicomputer is the nucleus of the system and, in addition to document conversion, has three other subcomponents: directory services, systems configuration, and management and user net accounting.

With directory services, users enter information such as the type of LAN they are on and the word processing program they are using. This information is used to determine the proper document-translation format needed to reach that user.

The configuration capability allows the system administrator to configure and manage the network from the standpoint of the application in use. For example, in a messaging application, the system would know where all users are, who those users are and the types of systems they are running on. It would also be able to monitor traffic.

The application platform's accounting function will log traffic, types of messages, length of messages and message recipients.

The product is targeted at large users with multivendor networks, as well as net service providers that could resell gateway functionality.

Communications Server will be offered in early 1991 for DG's AViiON Unix-based workstation line. This release of Communications Server will be available 120 days after receipt of order. A software license will cost from $99,000 to $641,000. ◘

NIST plans to accredit labs

continued from page 4

this accreditation would take place.

In addition to setting up a plan for the accreditation of labs, the NIST plan sets out to establish a means for accrediting and registering test tools used in conformance testing. The National Computer Systems Laboratory, a division of NIST specializing in computer standards, will establish this registry, Nightingale said.

Copies of the NIST Proposed Federal Information Processing Standard for GOSIP Conformance and Interoperation Testing and Registration are available from the Standards Processing Coordinator, NIST, Technology Building, Room B-64, Gaithersburg, Md. 20899, or call (301) 975-2816. NIST will accept public comment on the plan through Feb. 12, 1990. ◘

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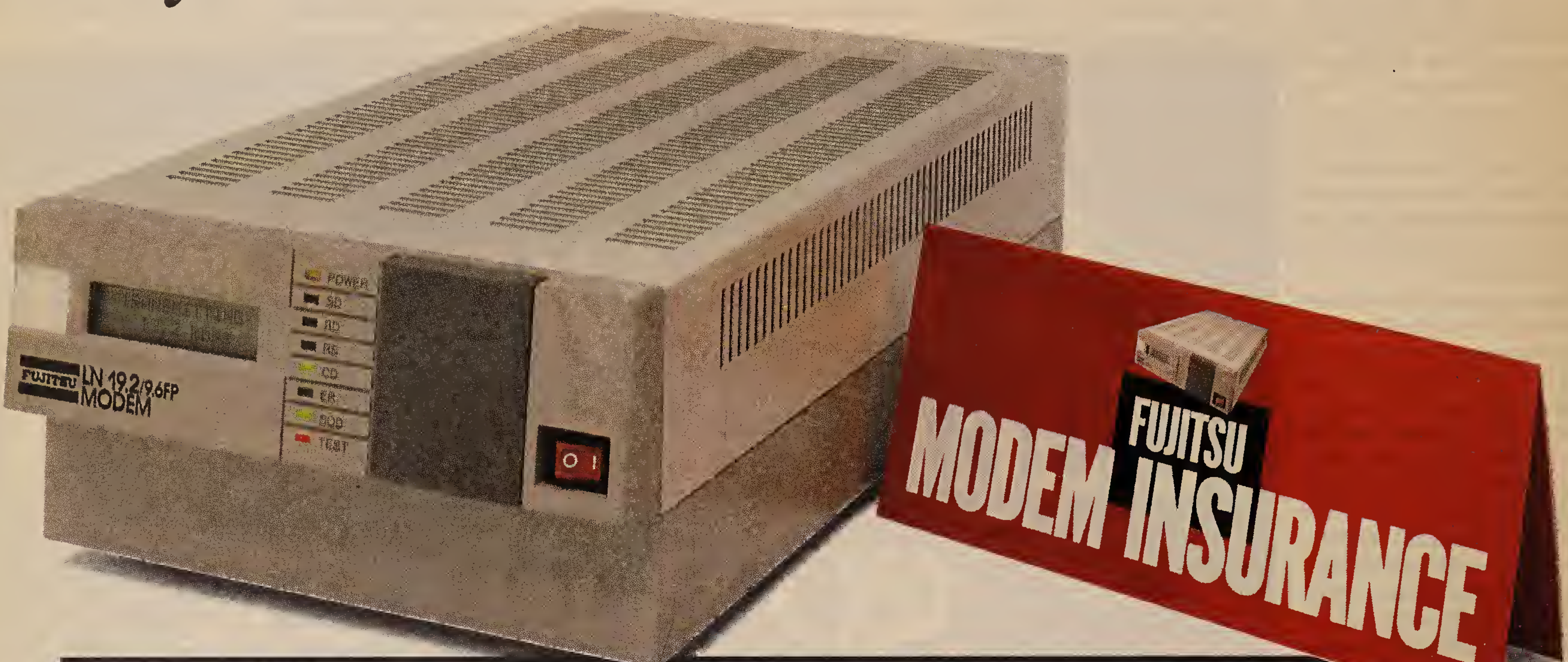

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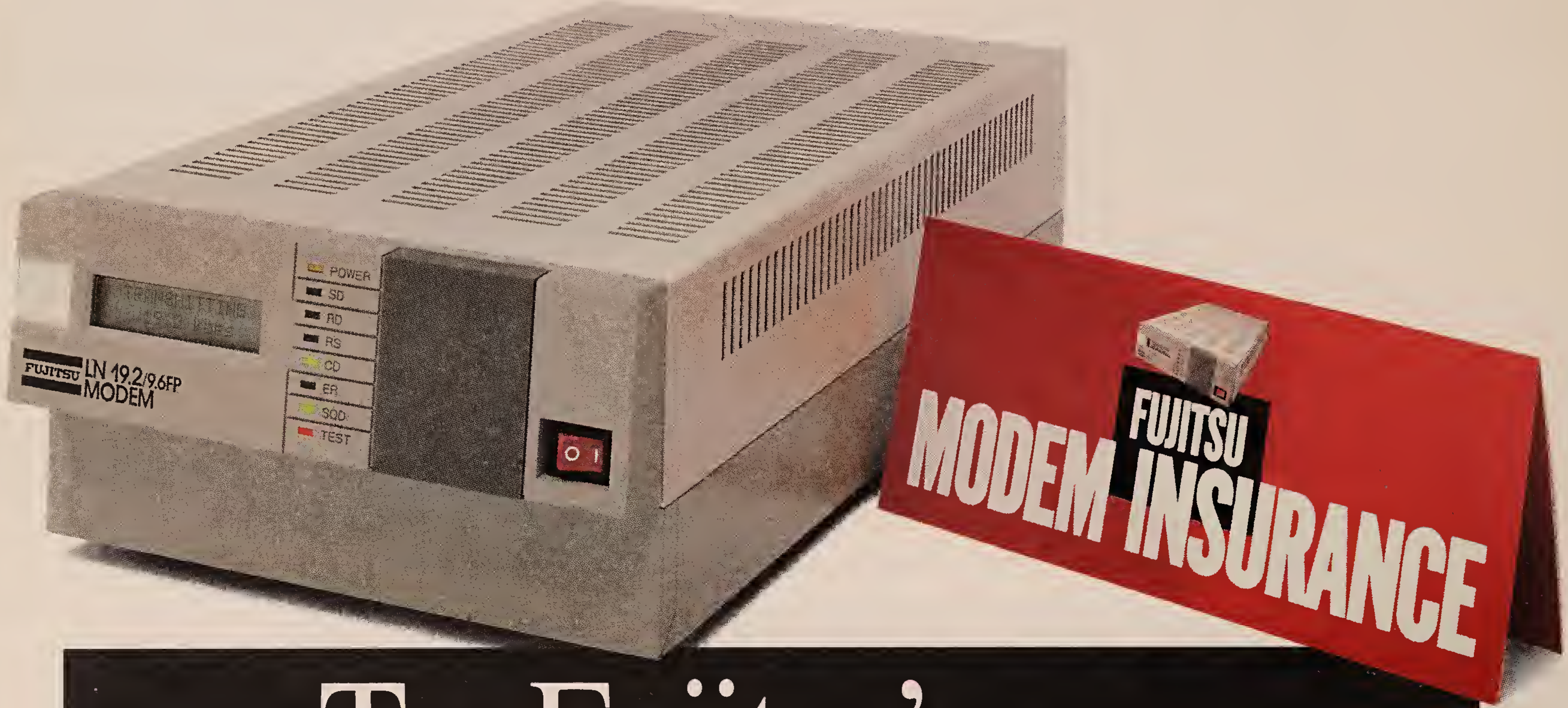

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NETWORK MANAGEMENT SOLUTIONS

NETWORK WORLD

To: *Network World* P[illegible]ers
From: Gary Bea[illegible], Publisher
Subject: Finding 1990's Solutions to Your Network Management Needs

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- What's New in Network Design/Optimization Tools
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- Automated Network Management: Are We There Yet?
- Update: Carrier Supplied Network Management Tools
- Artificial Intelligence in Network Management

Local Area Network Management

- Progress Report: LAN Management Standards
- LAN Design and Optimization Tools
- Integrating LAN Management with WAN Management Tools
- LAN Management Assessment
- MEGA-Multi LAN Management
- LAN Management in the OS/2 Environment

User Strategies

- Integrated Network Management User Panel
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- OSI Network Management Strategies
- LAN Management Strategies
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continued inside

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